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CONTENTS

Editorial 135
Papers:
The Trend of Veterinary Practice—W. H. Welch 140
Investigations on the Immunology of Swine Plague—R. R. Birch and J. W. Benner 148
Remarks on "Hog Flu"—M. Dorset, C. N. McBryde and W. B. Niles 163
The Role of the Udder and its Secretion in Bovine Infectious Abortion—Ward Giltner, I. F. Huddleson and R. L. Tweed 172
The Character and Possible Significance of the Bang Abortion Bacillus that Attacks Swine—W. E. Cotton 178
The Control of Equine Infectious Abortion in the United States Army—G. H. Koon and R. A. Kelser 193
The X-Ray in Canine Practice—George P. Frost 197
Gastroenteritis in Small Animals—O. V. Brumley 200
Discussion of Papers in October Journal 207
Clinical and Case Reports:
Obturator Paralysis—A. R. Galbraith 213
An Outbreak of Rabies—J. T. Quarll 215
Another Case of Blackleg in Sheep—Hadleigh Marsh 217
Abstracts 219
Reviews 226
Army Veterinary Service 228
Association News:
Proceedings of Fifty-Ninth Annual Meeting, A. V. M. A. 230
Other Meetings 257
Communications 267
Necrology 270
Miscellaneous 273

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RABIES IN WASHINGTON, D. C.

THE PRESENCE of rabies in the city of Washington was proved scientifically in December, 1892. The disease spread until in the fall of 1895 a fatal case in a woman called attention to the fact that rabies had become prevalent among the dogs of the city and the examination of all suspected cases was undertaken by the Pathological Division of the Bureau of Animal Industry. During the next ten months, beginning September, 1895, eight rabid dogs and two foxes were examined by means of animal inoculation and found capable of transmitting rabies to test animals. As will be seen by the following table, the destruction of the affected animals after their malady had reached the furious stage and they had possibly bitten several other animals did not tend to check the spread of the disease. Accordingly in June, 1907, an order was issued by the District Commissioners which required the muzzling of all dogs running at large in the District of Columbia. It will be interesting to recall something about the issuance of this order. A number of children had been bitten by stray dogs, which fact had been brought to the attention of President Roosevelt, as had also many protests from dog owners and others against the proposal to require muzzles.

Mr. Roosevelt sent for Dr. Mohler, the chief of the Pathological Division, for an interview during the lunch hour. The situation was explained briefly, and the fact that the public schools were to close on the following day for their summer vacation was mentioned incidentally, with the resultant danger especially to school boys who would be roaming the fields and woods about the capital. Immediately the President came to a decision, wheeled swiftly in his chair, reached for the electric button, and summoned his secretary, Mr. Loeb; a letter was dictated at once to the District Commissioners calling their attention to the conditions that existed, and asking immediate action. The Board met at 2 p. m. and issued an order effective the same day, which was published that afternoon in the local papers.

This order resulted in the impounding of almost twice as many dogs, but after a year or so it became customary for dog owners to remove the muzzles and release their dogs as soon as the dog catchers were thought to have ended their work for the day. In August, 1910, a more restrictive order was issued by the Commissioners, the enforcement of which has reduced slowly the number of rabid dogs found, the number of animals impounded, and the number of dogs running at large.

Until the present Board of Commissioners took office muzzles

Year	No. rabid dogs from D. C. examined by B. A. I.	No. licensed by D. C. Tax Collector	No. impounded by health office	Amount tax received D. C.
1904	14	9,216	3,219	$16,773.00
1905	13	9,790	2,656	17,819.00
1906	8	10,116	3,139	18,411.00
1907	12	11,021	3,985	20,059.00
1908	61	10,998	6,694	21,424.00
1909	79	11,215	6,946	21,424.00
1910	58	11,313	4,929	21,489.00
1911	75	10,250	5,531	21,921.00
1912	56	9,061	4,703	20 026.00
1913	52	8,659	3,599	17,589.00
1914	56	8,636	3,768	16,759.00
1915	8	9,141	3,210	15,901.00
1916	7	7,917	2,973	16,637.00
1917	5	8,187	3,257	14,414.00
1918	34	8,808	2,747	14,973.00
1919	35	9,280	2,854	16,031.00
1920	9			16,925.00
1921	12			

The number of dogs licensed as given in the above table is approximated for a portion of the years included, as definite records are not available for a few of the earliest and latest years reported.

were required throughout the year, but in the spring of 1921 the city heads changed the regulation to provide that muzzles would be required only from July 9 to October 9. While the Health Officer recommended that the former ruling requiring muzzles throughout the year be continued, the Commissioners decided that there was little need for covering the mouths of canines during the winter months. This decision of course is based on expediency rather than on any scientific foundation as dogs are just as liable to contract rabies on July 8 as on July 9. However, it is the intention of the present Commissioners to watch results and be guided by them as to further action for the control of stray dogs.

ADDITIONAL ASSOCIATIONS

IS IT professional unrest or an irrevocable necessity which encourages the formation of new veterinary medical associations? Maybe it is not either one; however, there appears to be a tendency to start something new and those with the spirit of enthusiasm are able to advance splendid reasons why new associations should be created. Conversely, another element is able to produce arguments to the contrary and after one has carefully listened to both sides, the situation is still befogged and the mists do not quite clear away. It is a fact that a number of states support more than one veterinary medical society and in a number of instances, a group of states are maintaining an association in addition to their respective state organizations.

Every qualified veterinarian should feel it his first duty to support loyally his home state association and the A. V. M. A. These two should receive first consideration and be given well measured expression before launching any new adventure. We must not forget that the old associations are established and can serve all purposes well if only the members forget *self* and use the organized agencies already developed toward advancing the veterinary profession. Many have grown gray in the service; they have met adversity and suffered defeat, but still they remain loyal and refuse to divide their talents and enthusiasm with any new order.

New associations require liberal financing and veterinarians contemplating their formation are usually members of the

State Association and A. V. M. A. respectively, therefore, as the question of dues and other expenses plays an important part, the temptation is offered to neglect one and to support the other. Whichever way the members goes, his decision is bound to weaken materially the forces of one society. On the other hand, the more veterinary medical associations which become successfully established, the greater advancement the profession will enjoy.

All professions demand the spirit of democracy and will not tolerate, at any cost, a domineering autocratic condition. The minute autocracy appears in an association, the entire system becomes faulty and the framework of the structure stands alone as a gaunt skeleton. This situation obtaining makes men restless because it robs them of their inherent right, notably, to enjoy equal rights. The one great eternal principle of success is to use well what we already have, and mold it into an indestructible force. This being accomplished, would there be any argument against a group of states combining their meeting dates and every three or five years have a joint meeting? Think it over.

If the veterinarians organizing these new associations feel sufficiently enthusiastic and financially able to continue their old obligations, then very little can be said against the undertaking. E. I. S.

THE OLD ORDER CHANGETH

AGRICULTURE'S stupendous tribute paid to insects and plant diseases has for too long been tolerated by a more or less national psychology founded upon the ramshackle premise that these pests are ineradicable and that the best we can hope for is to keep them "under control." We refer only to those for which science has discovered remedies. In most cases those remedies have been applied but half-heartedly because we have held but a half-hearted belief in them.

It called for a daring imagination on the part of General Gorgas to undertake the cleaning up of the Canal Zone and thus so totally to reverse the order of things as to make certain human diseases there merely an unpleasant memory. But he did it.

Many years ago New Orleans put up a monumental fight

to eradicate totally the tiny *Stegomyia fasciata,* the only mosquito which is capable of transmitting yellow fever. Think of hunting down every teacupful of standing water in the labyrinthine vastness of a city and ridding every such breeding place of mosquito life! New Orleans did this.

And yet only recently the doctrine of eradication has begun actively to supplant that of control, in the general scheme of applied entomology, mycology and bacteriology. We are witnessing an absolute facing about of the practical application of science by our Federal Department of Agriculture in such instances as its campaign for eradication—no longer control—of the cattle tick and bovine tuberculosis. The minds directing these efforts now refuse absolutely to tolerate any such compromise as "control measures." Nothing short of total eradication, drastic as may be the means to the end, is their goal.

This in a sense is ephocal. It marks a turning point. Daring as are such conceptions in the face of the time-buttressed tolerance of tick and TB, yet the initiative now taken daily gathers momentum and in due season is sure to set up a national mental reaction. And by virtue of this new it-can-be-done state of mind we shall make an even better job than ever of controlling those pests for which science as yet has discovered no specific.

A malignant offspring of the old psychology has been the brood of parasitically minded humans who would perpetuate a menace and hand down the task of its control as a heritage. Many a crop of political plums has been grown on a national scourge. And by the same token many a campaign of eradication has aborted as a direct result of determination on the part of those charged with the practical details not to "work themselves out of a job." Such beings have always sheltered their derelictions behind the cloak of that established state of mind which feeds on the creed of control but has not dared espouse eradication.

But we have annihilated such intangible things as time and space with the automobile, aeroplane, radio. Then what, in comparison, is the task of annihilating tangible, visible parasites? Nothing! It is half done when we have destroyed the thought that it cannot be done.—*Editorial in the Country Gentleman, July* 15, 1922.

THE TREND OF VETERINARY PRACTICE[1]

By W. H. WELCH
Lexington, Illinois

IF THE APPELLATION of "Doctor" be legitimately extended to include all who minister to those ailing in either body or mind, through "osteopathic," "chiropractic," "hypnotic," "Christian Science," or what not methods, then surely may the practice of veterinary science in its primitive state be claimed to have existed from almost the beginning of time. It has always been an honorable calling, and was so recognized by God himself. Abel, the brother of Cain, was a keeper of sheep, and "the firstlings of his flock were made an offering unto the Lord, and the Lord had respect unto Abel, and unto his offering." Throughout the Holy Writ there is declared a manifest respect for the caretaker of animals, as evidenced by the positions of importance to which David and others were called, while even Christ himself did not despise the appellation of "the Good Shepherd." The Bible also records that epidemic of the "very serious murrain laid upon the cattle, horses, asses, camels, oxen and sheep, belonging to Pharaoh and his hosts," in which the death rate was 100 per cent. Furthermore, we learn that the question of sanitation was a problem in those days, the law of Moses commanding: "The flesh of the bullock, and his skin, and his dung, shalt thou burn with fire without the camp." Again it is recorded that on one great occasion the welfare of the entire animal kingdom was committed unto the care of Noah, and all animals coming under his ministration lived to perpetuate their kind, while all those denied his unequalled hospital facilities perished from the face of the earth.

Coming to our own land and times, the real science of veterinary practice has been developed within the memory of many here present. Some recall quite vividly the old farrier, who knocked out wolf teeth and poulticed the foot with cow manure until the "gravel" worked out. Later he became known as a "horse doctor," because he really "cut colts" for a living, but doctored horses for "their water," "bots," and "lung fever."

[1] Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

About this time there was developed the theory that all disease has its origin in the blood, whereupon enters the "veterinary surgeon," whose surgery consisted mainly of bleeding the animal so long as it could stand, and the owner for all that he would stand. Naturally, in the process of this evolution his clientele practically compelled him to undertake the treatment of other domesticated animals, and it was during this period that we learn of the marvelous cures effected among cattle suffering from "wolf in the tail," "hollow horn," or perhaps the highly prized family cow had been so unfortunate as to "lose her cud." The faithful dog also occasionally demanded attention, for "hydrophobia" was a very common disease of those days, and many lives, both human and animal, were saved (?) by the magic of the madstone. Out of all this seething mass of superstition and ignorance, due principally to enlightenment through the agency of schools devoted to the teaching of veterinary science, there has emanated a gentleman bearing the earmarks of being college-bred and known professionally to the world as a veterinarian.

Perhaps the most remarkable change recognizable in veterinary practice is observed in the changed character of the graduate himself. Two or more decades ago few young men were entering the veterinary colleges of our country, while matriculants varying from thirty-five to fifty years of age were very common. Horses were very high in price, and veterinarians were scarce, consequently the crying demand for "horse doctors" echoed from every locality. Indeed, excluding dairy centers, the horse constituted almost the entire practice of both city and country practitioner. Our college courses were of but two years, and while we received a smattering of comparative anatomy, pathology and medicine, the curricula of the different schools dealt mainly with the equine subject, and it would be the rankest of flattery to say that they graduated us as "qualified veterinarians," because they graduated us purely as "horse doctors," and rather poorly qualified at that. There was not time for adequate instruction in all branches in so brief a course, so that we majored in the subjects of "Theory and Practice" and "Materia Medica" at the expense of the balance of the curriculum. We left school solemnly impressd that we had graduated from the greatest institution of its kind, and that there was but little more, if any, to be learned.

Sadly enough, many a graduate of that period never found out differently, for immediately upon completion of his course he jumped at once into a lucrative practice, and he was so much better than the empiric whom he supplanted that he was given a much higher rating than he really deserved. There were comparatively few graduates in those days, and small wonder that many of these should absorb some of the unethical tactics of his empirical opponent, and later on hesitate to become on friendly terms with a younger graduate and decline to mingle with his professional brethren in the meetings of the association. The empiric had taught him to guard zealously any superior methods or knowledge of which he might become possessed, else his competitor would profit thereby.

Then came the great financial depression, wherein horses possessed but slight value, and practice went "blooey." Many left the profession, and those who stayed in lost interest in their practice, finally getting into a rut from which they have never extracted themselves. They read practically no literature, never attend an association meeting, nor have aught to do with their fellow practitioners. They make no progress, and might very properly be christened hermits who have lost out on the most beautiful and valuable part of their life, the companionship and fellowship of their professional brethren.

How different the graduate of later years, who, with his preliminary high-school education as a foundation, and his very complete four years of veterinary instruction, lacks only experience and adaptation to make of him a truly qualified veterinarian. He enters a field pervaded by a different atmosphere. He is no longer just a "horse doctor," but is the confidential adviser of the livestock owner concerning all the domesticated animals on the farm. It is his function to keep them well as certainly as it is to treat the ailing, while as a sanitarian he is no less valuable than the physician in guarding the health of his client's family. He is the leader in bacteriology, pathology and other fields of original research, while as inspector of foods his services are indispensable. He is the cultured professional gentleman who without jealousy is daily rubbing shoulders with his competitor, both at home and at the various association meetings. To the livestock owner he is indispensable, and he is one of the community's greatest assets.

The past two decades have witnessed a wonderful change in

the character of veterinary practice itself. The city veterinarian first noticed it when his cat and dog practice began to increase, while his equine patients gradually became less numerous. The automobile displaced first the high acting and popular coach horse, and gradually the truck made great inroads on the heavy draft animal. With the demand for horses lessened, the country soon began to cease breeding, and since a large percentage of the country veterinarian's practice is with the young, growing animal, equine practice became much less. But the family cow came into her own, and was as highly prized as had ever been the family horse of old.

Then occurred the most important discovery that our profession has ever known, when from our Bureau of Animal Industry came the important announcement that the dreaded scourge of hog cholera, that periodically swept the "mortgage lifter" from the earth, could be prevented, as the animal could be successfully immunized. Placing as it did the swine industry on a safe financial basis, its value to the entire world can not be estimated, while the hog, hitherto almost entirely ignored by schools and veterinarians alike, strangely enough now becomes one of the profession's greatest assets.

Previous to the development of the present method of immunization cholera was considered about the only serious affliction of the porcine race, and practically no attention was devoted to swine diseases by our schools, the original research departments, or by veterinarians in general. With the advent of immunization, therefore, it was but natural that disaster should sometimes follow work in the field, even though conducted by veterinarians well versed in all phases of practice as it pertains to all animals other than the hog. For the past few years, however, much time and study have been devoted to swine diseases by all interested persons, and the veterinarian, daily becoming more proficient in the diagnosis and handling of porcine troubles, is demonstrating to all unprejudiced minds that it is on him that the swine owner must depend to guard successfully the health of this vast industry. The swine industry of today is on a practically safe financial basis for the first time in its history, and has been placed there solely by reason of the efforts of the veterinary profession.

There are still problems concerning the hog, and in the hands of the veterinarian alone rests their solution. That the county

agent or anyone else who imagines himself capable of rendering intelligent service along this line, by exploiting vaccination in the hands of other than the veterinarian, is, in his gross ignorance, perpetrating a great injustice on the hog, the hog owner, the veterinarian, the county which employs him, as well as on the nations at large which his methods will eventually deprive of much pork, is a self-evident fact. The farmer attempts vaccination purely as an economic measure. He has possessed an exaggerated idea of the amount of profit that the veterinarian was receiving from hog vaccination, while on the other hand the veterinarian on his part resented any inquiry into that matter on the part of the farmer. Unscrupulous serum companies, having regard only for their own income, and with no serious concern as to the ultimate effect of such a policy, paved the way for farmer vaccination, by making a bid for the serum business of the county farm bureaus. They were not sufficiently far-sighted business men, or they should have seen the ultimate downfall in reputation of their serum in hands of the incompetent novice. The farmer himself freely admits the superiority of the veterinarian in vaccination, but because he has been led to believe that he can successfully perform it, only time and experience will teach him the lesson that the veterinarian is the cheaper in the end. When he discovers this, as he certainly will do, he will return to the veterinarian, and will have nothing but condemnation for the county agent who in his ignorance has led him astray.

When the farmer and the veterinarian come into a mutual understanding of this subject the matter can be amicably adjusted. This can be accomplished in most instances through the county veterinary association, in conjunction with the county farm bureau, and constitutes one of the strongest pleas for the organization of veterinarians by counties throughout our nation. The interests of the livestock owner and the veterinarian are identically the same, and the closer they become united the better for each. Farmer vaccination can not last, because in time it is certain to be followed by disaster. Moreover it not only weakens the control of our sanitary authorities on a very serious contagious disease, but it is a problem that is very intimately associated with the meat supply of our nation, and as such should be absolutely prohibited.

An interesting and profitable feature of practice today, and

one that is certain to increase greatly, is shown by the frequency with which we are called upon to prescribe for poultry. Those who have had the benefit of instruction on this subject during their college career, or have otherwise prepared themselves for this phase of practice, will readily testify to its importance from a financial standpoint. The farm flock during the past few years has been one of the best paying propositions of the farming industry, and greater care is being given them than ever before. The increase in the number of purebred flocks is remarkable, and the bird valued at from $5 to $25 is encountered with wonderful frequency. When one has demonstrated his ability to cope intelligently with the problems of the poultry raiser, he renders a service that is adequately appreciated by all members of the family, and one from which he will probably receive more advertising of a favorable character than he would obtain in any other manner. It is a branch of our profession that has been too long neglected, both by the veterinarian and by our schools, and promises to play no small part in the future success of the progressive veterinarian.

The "accredited herd" work instituted by the Bureau of Animal Industry promises to add slightly to the income of the "accredited veterinarian." Without doubt, the purebred herd and dairy herds that are furnishing milk to municipalities requiring such test will continue to be maintained as "accredited herds," while county units of "tuberculosis-free areas" are certain to be the popular method of extending this work just as soon as we have sufficiently recovered from the financial depression from which we are emerging. However, until this work is taken up as a county or township measure, I should not be surprised to learn that the owner of a grade herd will remain perfectly contented in the knowledge that his herd has been pronounced free from tuberculosis by the requisite number of official Federal tests, and unless new animals are added, or a tuberculosis-free area is established, that he should cease testing his animals. Let us encourage the good work among our clientele with the hope that ultimately our townships and county may be placed on the free area list.

I feel that there is a future belonging to the veterinarian in the position as county livestock adviser. Who more capable than he in advising along all lines of animal husbandry, sanitary problems, and all phases of livestock production? The

time is coming when throughout the entire livestock belt such a man will be employed in a majority of the counties, and he will be a wonderful asset in the improvement of livestock in his locality.

I can not close the subject assigned me without criticising a lamentable habit that is fast developing among our practitioners, of purchasing from their drug houses a line of proprietary specialties, instead of compounding their own remedies for each individual case. Indeed, the entire medical profession may be said to be degenerating into a state of educated quackery along this line. The office of the average physician is today filled, not with fluid extracts and tinctures, etc., as of yore, but from top to bottom the bottles are labeled "Rheumatic Remedy," "Diuretic," "Uterine Tonic," "Chologogue," etc., and the veterinarian is fast following in the same footsteps. Ask the majority of those who have become addicted to this habit what the preparation contains that he has just administered to an animal, and 75 per cent of them can not name all the ingredients, much less the proportion of each drug per dose. The oily-tongued salesman explains how much better his firm can compound these remedies than can the veterinarian, and impresses on your mind how thoroughly ethical they are, since each drug and the amount of each is plainly stated on the bottle. While all this may be perfectly true, I have known as dangerous a drug as barium chlorid to be camouflaged under the guise of "other saline purgatives."

The practitioner who allows himself to become addicted to this custom is fast losing out on his knowledge of medicine, instead of coming to know a drug more thoroughly in its action. He will in time become merely a mechanical automaton, and the stock owner who is able to diagnose his animals' trouble will fare equally as well by going to the drug store and purchasing over the counter the remedy that has been compounded by some other firm for that particular ailment. And who can blame him? For he is perhaps receiving just as good treatment for his animal as his local veterinarian was dealing out to him. The empiric has always treated his patients by just this process. He has his favorite prescription for each disease, and if that one does not "cure" the animal he tries another prescription. Let us steer clear of this practice and avoid shotgun prescriptions, so that when we administer a drug we may

realize when we obtain the expected result, and instead of being an actual menace to our patrons we will prove a positive benefit.

The public is today demanding better service of the veterinarian than ever before, and never was efficient service better appreciated. Your best patron of today is not the man who has no knowledge of animals, but on the contrary he is the agricultural graduate who is fairly well versed in all lines of animal husbandry. It is not sufficient that the veterinarian of the future be able to treat sick animals intelligently, but he must be more thoroughly grounded in the very fundamentals of the profession, as they relate to animal husbandry, sanitation, etc., so that he is capable of advising along all problems connected with the care and handling of livestock. The progressive veterinarian of today is one of the real assets and blessings of his community, and practice in the future will progress or decline with us in proportion to the skill that we display. Our profession of today is, I believe, as successful as is the medical profession in treating and preventing disease. On the question of eugenics we are far in advance of them, as we have legislated our defectives out of business, while the medical profession still permit their syphilities and imbeciles to perpetuate their kind.

Our work goes hand in hand with the county farm organizations, and instead of antagonizing them in a fight in which we should fare second best, let us prove our ability to lend intelligent aid to their problems, to the mutual advantage of each. Our future is what we make it. Let us prepare ourselves for our work, and the work will be prepared for us.

The Technical Committee of the Milk League of France has adopted the following resolution:

"In view of false interpretations published with regard to the recent communication of Prof. Calmette to the Academy of Medicine, on 'Tuberculosis in Milk Cows,' interpretations of a nature to spread wrongly in the public mind the conviction that children may consume without danger the raw milk of cows which react to tuberculin, the Milk League asks that it be clearly specified that cows whose milk is intended for human food should be submitted to the tuberculin test at regular intervals, and that the milk of those which have reacted should not be consumed except after boiling."

INVESTIGATIONS ON THE IMMUNOLOGY OF SWINE PLAGUE [1]

By R. R. BIRCH *and* J. W. BENNER

Experiment Station, New York State Veterinary College, Cornell University, Ithaca, N. Y.

IT IS IMPORTANT for veterinary practitioners and their clients to learn the true value of biological products which are daily brought to their attention in advertisements. Numerous inquiries come to us concerning the value of swine-plague vaccines and bacterins. We conduct a swine practice as a part of the ambulatory clinic of the New York State Veterinary College and it is our desire to obtain first-hand information for the benefit of our students and our clients. Moreover, there are points concerning important phases such as cause, character and occurrence of this disease which are still hazy and under controversy.

In 1919 we decided to begin with the very fundamentals of swine plague and to continue the work until experimental data should enable us to take an intelligent stand for or against biological products claimed to be very valuable prophylactic and curative agents for this disease. We have confined our experiments as much as possible to swine in order to eliminate what seems to us a grave mistake, namely, experimenting with rabbits and guinea-pigs and trying to apply the results to swine.

We are continuing our work, hoping to find some effective immunizing agent, so this paper must assume the nature of a report of progress. Our data, though incomplete, are sufficient to indicate very clearly the results which may be expected from certain immunizing agents. All investigators do not draw the same conclusions from like data, but our results to date are submitted in the hope of aiding those who have been perplexed by the problem of immunizing against swine plague.

From our previous work with *Bacterium suisepticum* we believe we have sufficient evidence to warrant the following statements:

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[1] Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

1. That *Bacterium suisepticum* is the specific cause of a swine disease called swine plague or hemorraghic septicemia of swine.

2. That swine plague occurs sporadically as a well-defined disease without complications, but that its most common occurrence is in a complicated form.

3. That death can not be caused by subcutaneous injections of live, unattenuated organisms with any regularity or precision.

4. That intravenous injections of 1 mil of a heavy suspension of the unattenuated organism regularly kills or disables pigs under eight weeks of age and the same dose frequently kills or disables older pigs.

5. That pigs artificially inoculated with intravenous injections of a suspension are inclined to show joint lesions which are not commonly observed in naturally infected cases.

6. That pigs closely confined in pens with animals artificially infected may very rarely contract the disease.

7. That in swine killed by a suspension of *Bacterium suisepticum* given intravenously, the blood may or may not contain the organism, depending on the grade of immunity of the animal.

We have seen *Bacterium suisepticum* manifest its harmful effects on swine in a number of different ways. We are giving the various forms of swine plague as we have seen them, noting under each form the manner in which it was produced and its predominating characteristics. The forms are not always separate and distinct. We have seen two or more in the same animal, but each form will be described briefly because a different character appeared to predominate in causing either the disability or death of the animal.

1. A general septicemia which may occur in peracute form, the animal dying in 48 hours; in an acute form, the animal dying in 5 or 6 days; or a chronic form, the animal living for 20 to 25 days, then either dying or recovering.

In all three of these variations we have recovered the organisms from the blood of dead animals by the inoculation of agar slants and the injection of small quantities of heart's blood into rabbits. We have seen the peracute and acute septicemias follow intravenous injections of heavy suspensions and the chronic septicemia in two of our check pigs that contracted the disease by close contact with pigs which we had infected artificially.

2. What appears to be a toxic form, occurring peracutely and

causing death in 48 hours. The blood of swine dying of this form is sterile, as proved by culturing and rabbit inoculations, thus differing strikingly from the septicemic forms just described.

We consider this form as especially significant from a diagnostic standpoint, for it is evident that when it occurs in animals sent from the field to the laboratory for diagnosis the cause of death is very apt to remain a mystery when the blood is found to be sterile. If the bacteriological examination is somewhat delayed, as frequently happens in field cases, and such organisms as *Bacillus coli*, streptococci, etc., pass from the intestinal tract to the blood, the findings may be misinterpreted and give rise to numerous and varied pseudo-causes of disease and death of swine.

Our only explanation for this so-called toxic form of swine plague may be based on the theories of immunity, *i. e.*, that the protective forces of the body, antibodies (Ehrlich) and phagocytes (Metchnikoff) have been increased to such an extent that they completely destroy the organisms and in this rapid destruction enough endotoxin is liberated to kill the animal. The animal body in these cases can overcome the bacteria but it can not withstand the toxin liberated. From certain descriptions of cases of hemorrhagic septicemia in cattle recently brought to our notice, we believe that possibly this same phenomenon occurs in that species.

3. A joint form which usually follows in 24 to 48 hours after an intravenous injection which is not sufficiently large to kill the animal. The infection localizes in the joints, especially the knees and hocks, causing disease ranging from a slight limp to complete and permanent disability. The pig may lie for weeks unable to rise but will eat regularly if helped to food. The temperature and respiration remain normal. As a rule we have killed these animals after two or three weeks to terminate their helpless condition. The blood has been found sterile but the exudate in the joints invariably contains the organism. In the septicemic forms we have frequently seen a tendency toward localization.

Newsom and Cross have noted lameness in sheep caused by intravenous injection of *Bacterium ovisepticum*, while Murray and McNut, in a recently published article on "The Tendency of Organisms of the Pasteurella Group to Localize," cite this tend-

ency in various species of domestic animals after organisms of the pasteurella or hemorrhagic septicemia group have been used upon them.

4. The pulmonary or pectoral form, which is more or less chronic. This is the form usually described in standard textbooks and is thought of as most typical of natural infection. This form occurred in two of our check pigs which were kept closely confined with four others that had been given intravenous injections of *Bacterium suisepticum*. These two checks became sick the third day; one was sick for 20 days and recovered; the other was sick 25 days and died. The pig that died showed a typical swine-plague pneumonia as described by good authorities and had the organism in its blood, as was demonstrated on culture media and by inoculations of rabbits with a small quantity of heart's blood.

5. A localized form in which abscesses formed at the point where live unattenuated organisms were injected. Such abscesses enlarge for three or four weeks and remain almost indefinitely. They consist of a mass of pus completely encapsulated by connective tissue. Upon killing these animals we have found the blood sterile but the contents of the abscesses teeming with the swine-plague organism.

By subcutaneous injection of our most virulent strain, the virulence tested on rabbits, we have not been able to kill or seriously injure strong, healthy pigs with any regularity or precision. Local abscesses occurred and there was a stunting effect, but death was the exception rather than the rule. We have therefore vaccinated by injecting pigs subcutaneously with unattenuated organisms and tested the immunity thus conferred by intravenous injections of similar virus. The vaccine used was a physiological salt suspension of *Bacterium suisepticum* made by washing the growth from agar slants incubated from 16 to 20 hours at 37 degrees C. The suspensions used for the trial injections were prepared in the same way.

The suspension for each vaccination was tested on rabbits, and for the trial injection, in addition to the rabbit test, a nonvaccinated pig was given the same dose in order to compare the effects on vaccinated and unvaccinated pigs.

As the work which we have done to determine the pathogenic significance of *Bacterium suisepticum*, together with two of our immunizing experiments, has been published in detail in the

1920-1921 report of the New York State Veterinary College, we have summarized the results of our previous investigations and will in this paper attempt to describe briefly an immunizing experiment which is typical of the regularities and irregularities that one may expect from the microorganism in question.

From our former immunizing experiments we have evidence that subcutaneous injections of unattenuated organisms will not confer a solid immunity against subsequent intravenous injections. But we have had indications that a certain grade of immunity may be conferred by this method of administration. The purpose of the following experiment was to study further the grade of immunity which might be produced with a vaccine.

The experiment was begun on a group of twelve pigs representing two litters, seven from one litter and five from another. All were confined in the same pen throughout the experiment. These pigs were about six weeks of age when the first injection was made December 10, 1921. All were of grade Chester White breeding. The seven had not been so well nourished as the five of the other litter. The former averaged 15 to 20 pounds each and will be termed "the smaller pigs"; the latter weighed from 25 to 30 pounds each and will be refered to as "the larger

TABLE 1.

Pig No. [1]	Vaccination 1.	Vaccination 2.	Trial Injection	Trial Injection
	Subcutaneous, Dec. 16, 1921	Subcutaneous, Dec. 23, 1921	Intravenous, Jan. 3, 1922	Results
70 S. P....	Dec. 10, '21, 1 mil intravenously. Dead Dec. 12, 1921.			
71 S. P....	1 mil.....	3 mils.....	1 mil.....	Slight general stiffness.
72 S. P....	2 mils.....	....do.....	....do.....	Very slight general stiffness.
73 S. P....	.....	1 mil.....	....do.....	Dullness, inappetence, weakness, chilling. Lameness in left front leg.
74 L. P....	2 mils.....	5 mils.....	....do.....	Slight general stiffness.
75 L. P....	....do.....	....do.....	....do.....	Very marked general stiffness.
76 L. P....	....do.....	....do.....	....do.....	Very slight general stiffness.
77 L. P....	.....	.....	Jan. 1, 1922, 1 mil.	Found dead 64 hours after injection.
78 S. P....	.....	.....	Jan. 3, 1922, 1 mil.	Complete and permanent disability.
79 S. P....	Control....	Control....	Control....	
80 L. P....	....do.....	....do.....	....do.....	

[1] S. P. denotes smaller pigs; L. P., larger pigs.

pigs." All were in healthy, vigorous condition and had not been immunized against hog cholera.

Table 1 shows the vaccination experiment with details of each case omitted, and results from the trial injection only.

The effects of the intravenous injection on the vaccinated animals lasted for about a week and were followed by a gradual recovery.

It will be noticed in Table 1 that only eleven animals are accounted for, while in the original group there were twelve. On January 21 one pig of the group which had been kept as a control met accidental death and therefore has not been given a record number.

It was evident from the trial injection of January 3, 1922, that a certain grade of immunity had been produced by the vaccinations and that this immunity was in more or less direct proportion to the quantity of suspension of *Bacterium suisepticum* which had been administered.

ANTI-SWINE-PLAGUE SERUM

Experimentation on the animals of this group was continued by administering larger intravenous doses of the suspension of *Bacterium suisepticum*. This was done to test further the grade of immunity present in the various individuals of the group, to learn more about the influence of dosage on the grade of immunity conferred, and also to learn whether they could be hyperimmunized against swine plague to the point where they would produce a potent serum against the infection.

The suspensions used in the following operations were made and tested in the same manner as were those in the vaccination experiment just given. The details are again omitted for the sake of brevity.

The animals that had been used in the vaccination experiment had recovered from the trial injection of January 3 and seemed practically normal on February 7 when this experiment upon them was begun.

Pig No. 79 in Table 2 was used to compare the action of this sized dose on an untreated pig with treated pigs.

It will be seen that the grade of immunity demonstrated by the smaller pigs is in almost direct proportion to the quantity of suspension they received in previous treatments, while in the larger pigs this is not true. Pig No. 73, receiving only 1 mil

TABLE 2.

Pig. No.[1]	Date.	Intravenous Injection.	Results.
79 S. P.....	Feb. 7, 1922..	2 mils.....	Found dead in 16 hours. General septicemia.
71 S. P.....	....do.....	....do.....	In 20 minutes vomited. Feb. 7–14, droopy, weak, ate little. Feb. 14–28, recovered.
72 S. P.....	....do.....	....do.....	Slight stiffness and slight serous discharge from the eyes. Affected markedly less than pig No. 71.
73 S. P.....	....do.....	....do.....	Found dead in 16 hours. Blood sterile.
74 L. P.....	Feb. 8, 1922...	....do.....	Feb. 8–15, very stiff. Inappetence. Slowly recovered.
75 L. P.....	....do.....	....do.....	Do.
76 L. P.....	....do.....	....do.....	Slight stiffness. Rapid recovery.
80 L. P.....	....do.....	....do.....	Very slight stiffness Rapid recovery.

[1] S. P. denotes smaller pigs; L. P., larger pigs.

of the vaccine and 1 mil intravenously in the trial injection, was found dead in the same length of time as pig No. 79 which had received no previous treatment. This indicated a low grade of immunity, if any, conferred by the treatment given No. 73.

One of the surprising irregularities occurred among the larger pigs. No 80 received no previous treatment but showed less injurious effects than did those that received previous treatments. It seems that this pig had more resistance as a result of good care and no treatment than did the pigs which had been given the same care plus treatment.

This experience with pig No. 80 led us to believe that for the production of anti-swine-plague serum it would be better to take older, well-nourished hogs and start the hyperimmunizing process with a larger dose of suspension than to take pigs, as we did in the above experiment, and try to build up an immunity by increasing doses. However, we wished to see if we could still increase the dose of suspension in the hyperimmunizing process and not kill our pigs. So on February 28, when the pigs seemed to have recovered from the bad effects of the treatment received February 7 and 8, another treatment was administered as shown in Table 3. We used only part of the group, fearing that we might kill all the animals used.

Again pig No. 80, which had received only one previous treatment (2 mils February 8), withstood the increased dose of 3 mils much better than did Nos. 71 and 74 which had been given two subcutaneous and two intravenous injections previously.

No. 81 was about the same age as the "larger pigs" in the experiment (actual weight 72 pounds), but had not been treated before nor kept in the same pen with treated pigs. Since No. 80 had withstood a 2 mil intravenous dose on February 8 without previous treatment, we thought possibly No. 81 might withstand the 3 mil dose on February 28, but such was not the case. The deadly effect on pig No. 81, when compared with the effects on the other pigs, gave us at least a little information on the grade of immunity we had in the various individuals of this group and showed us also that 3 mils could not be used as the initial dose in pigs of this age.

TABLE 3.

Pig No.[1]	Date	Intravenous Injection	Results.
71 S. P.....	Feb. 28, 1922..	3 mils.....	Immediate collapse. Feb. 28–Mar. 11, inappetence, weakness, emaciation. Mar. 11–May 1, became normal but was undersize.
74 L. P.....	....do.....	....do.....	Found dead in 20 hours. Blood sterile.
80 L. P.....	....do.....	....do.....	Mar. 1, stiff and weak. Mar. 1–6, improving. Mar. 13, normal.
81.....	....do.....	....do.....	Found dead in 5 hours.

[1] S. P. denotes smaller pigs; L. P., larger pigs.

A serological test on rabbits was planned as a means of determining more accurately the grade of immunity present in these pigs, and the application was broadened to test other hog sera as well.

On March 14, 1922, the animals surviving the treatments just described were bled. The operations on this date were carried out in the same manner as in our anti-hog-cholera serum production, *i. e.*, the pigs were bled from the tails in vacuum, the blood defibrinated by shaking, then strained, bottled and preserved with 10 per cent of a 5 per cent solution of carbolic acid.

The serum from pigs Nos. 72, 75 and 76 was mixed and constituted one serum lot in the test. As has been seen in the tables, these pigs received practically the same quantity of suspension in proportion to their body weight. The serum from pig No. 80 constituted a second serum lot and was tested separately because the treatment this individual received differed markedly from that given Nos. 72, 75 and 76. Serum from pig No. 71 should have constituted another lot, but this pig was in such bad condition from his 3 mil intravenous injection of February 28 that he could not be bled.

A third lot of serum tested was bled from four normal shoats susceptible to hog cholera and about the same size and age as pigs Nos. 75, 76 and 80. For the fourth lot we used a bottle of our regular anti-hog-cholera serum.

TABLE 4.—SERUM TESTS ON RABBITS.

Rabbit No.	Serum, Mar. 14, 1922	Bacterium Suisepticum in Dilution (1-400), Mar. 17, 1922	Results.
144	10 mils, anti-swine-plague serum from pigs 72, 75, 76.	1 mil.....	Found dead in 138 hours. General septicemia.
145	....do.....	....do.....	Do.
146	10 mils anti-swine-plague serum from pig 80.	1 mil.....	Found dead in 144½ hours. General septicemia.
147	....do.....	....do.....	Do.
148	10 mils normal serum from pigs 82, 83, 84, 85.	1 mil.....	Found dead in 16¾ hours. General septicemia.
149	....do.....	....do.....	Do.
150	10 mils anti-hog-cholera serum, series W stock serum.	1 mil.....	Found dead in 19½ hours. General septicemia.
151	....do.....	....do.....	Found dead in 23 hours. General septicemia.
152[1]	.....	1 mil.....	Found dead in 16¾ hours. General septicemia.
153[1]	.....	....do.....	Do.

[1] Check on virulence of dilution of Bacterium suisepticum.

TABLE 5.—AGGLUTINATION TEST.

Pig No.	1–100	1–200	1–500	Check
82	++	−	−	−
83	++	−	−	−
84	+	−	−	−
85	+	−	−	−
72	+++[1]	+	−	−
75	+++	++	+	−
76	+++	+++	+++	−
80	+++	+++	+++	−

[1] Complete agglutination.

The normal serum and anti-hog-cholera serum were used because of slight indications that hogs as they advance in age acquire an immunity to the swine-plague organism. We have not, however, compared different ages by regulating our dosage to pounds live weight. If hogs do acquire an immunity as they advance in age, then the normal serum used in this test should show a certain degree of protective power and the stock anti-hog-cholera serum should prove still richer in swine-plague anti-

bodies, as our hog-cholera serum is always made from hogs more advanced in age than the animals bled for normal serum in this test.

As rabbits are so very susceptible to the swine-plague organism, we chose this species for the test given briefly in Table 4.

The results of these tests indicate that the blood from the animals hyperimmunized against swine plague had strikingly more protective power than normal serum and the anti-hog-cholera serum.

In the rabbit test, even though the normal serum rabbits and the checks were found dead at the same time, we think perhaps the normal serum had a slight protective power, since the bodies of these two rabbits were still warm and the checks were cold, showing that the checks had died first.

Again, the normal serum from the younger animals showed less protective power than the hog-cholera serum which was made from older animals. The agglutination test may prove valuable in measuring immunity. Both tests must be repeated before a rule can be made.

As the anti-swine-plague serum used thus far had been produced from animals susceptible to hog cholera, we next attempted to hyperimmunize hogs against both diseases to produce if possible a combination anti-hog-cholera and anti-swine-plague serum.

Pig No. 87 was one out of three that withstood the 2 mil intravenous injection. No 89 was one out of two that withstood the 1 mil intravenous injection. We then attempted a different method of administering the swine-plague suspension which seemed to be less hazardous to the life and health of the animal than the intravenous method, that is, of giving a large dose into the axillary space.

According to our rabbit test, the serum from pigs Nos. 90 and 92, receiving the intra-axillary injection, was not as high in protective power as that from pig No. 89, which had received 1 mil of the swine-plague suspension intravenously one week after the hyperimmunizing against hog cholera, but it was higher than that of pig No. 87, which had received a 2 mil intravenous injection of swine-plague suspension three days after the hyperimmunizing against hog cholera. The rabbit test shows also that the serum from pigs Nos. 90 and 92 had five times more protective power than it did before the swine-plague in-

TABLE 6.—HOG CHOLERA AND SWINE PLAGUE HYPERIMMUNES WITH RABBIT TEST.

Pig No.	Hog-cholera virus, intravenous	Swine plague suspension	Results.	Rabbit No.	Dose of serum, June 23, 1922	Dose of Bacterium suisepticum, June 26, 1922	Rabbits found dead
86	Apr. 14, 1922, 590 mils...	Apr. 14, 1922, 2 mils.....	Found dead in 42 hours. General septicemia.	.....	.....	.....	.....
87	Apr. 14, 1922, 610 mils...	Apr. 17, 1922, 2 mils.....	Apr. 18–29, badly crippled. Apr. 29–May 5, became normal.	172	10 mils.....	1 mil.....	70 hours.
				173	.....do.....	.....do.....	93 hours.
88	Apr. 14, 1922, 600 mils...	Apr. 17, 1922, 2 mils.....	Found dead in 18 hours. Blood sterile.	.....	.....	.....	.....
89	Apr. 25, 1922, 525 mils...	May 2, 1922, 1 mil.....	Badly crippled. May 23, about normal.	174	10 mils.....	1 mil.....	147½ hours.
				175	....do.....	.....do.....	120½ hours.
91	Apr. 25, 1922, 640 mils...	May 2, 1922, 1 mil.....	Found dead in 17½ hours. General septicemia.	.....	.....	.....	.....
90	Apr. 25, 1922, 610 mils...	Tail bleeding of May 10 before the injection of Swine plague organism.		178	10 mils.....	1 mil.....	20½ hours.
				179	.....do.....	.....do.....	Do.
92	Apr. 25, 1922, 500 mils...	.....do.....		180	.....do.....	.....do.....	Do.
				181	.....do.....	.....do.....	Do.
90	.....	May 10, 1922, intra-axillary injection of 20 mils.	Tail bleedings after injection of swine-plague suspension.	176	.....do.....	.....do.....	100 hours.
92	.....			177	.....do.....	.....do.....	117 hours.
.....	.....	.....	.....	184	.....	.....do.....	20½ hours.
.....	.....	.....	.....	185	.....	.....do.....	Do.
.....	.....	.....	.....	186	.....	.....	Remained healthy.
.....	.....	.....	.....	187	.....	.....	Remained healthy.

jection. We therefore decided to test the serum from these two pigs, and devised a combination test which would test the anti-hog-cholera properties of the serum and the anti-swine-plague properties as well.

The first tail bleeding for immune serum was made on Nos. 90 and 92 three weeks after the swine-plague injection of 20 mils. They were bled four times at one-week intervals. A composite sample composed of 25 mils from each bleeding was used in the combination test given in Table 7.

TABLE 7.—COMBINATION ANTI-HOG-CHOLERA AND ANTI-SWINE-PLAGUE SERUM TESTS ON PIGS

Pig No.	Anti-hog-cholera and anti-swine plague serum, July 6, 1922	Hog cholera virus, July 6, 1922	Suspension of bacterium suisepticum, intravenous, July 16, 1922	Results
193 (1)	10 mils.....	2 mils.....	.....	July 9–16, sick, recovered.
194 (2)	.....do.....	.....do.....	.....	July 9–20, sick, died.
195 (3)	15 mils.....	.....do.....	.....	No sickness.
196 (4)	.....do.....	.....do.....	.....	Do.
197 (5)	20 mils.....	.....do.....	1 mil.....	July 17–23, sick, died, General septicemia.
198 (6)	.....do.....	.....do.....	.....do.....	July 17–Aug. 18, sick, recovered slowly.
199 (7)	.....	.....do.....	.....	July 12 sick with hog cholera. killed.
200 (8)	.....	.....do.....	.....	Do.
201 (9)	10 mils anti-hog cholera serum.	.....	1 mil.....	July 17–20, completely disabled. Died. General septicemia.
202 (10)	.....do.....	.....	.....do.....	Found dead in 20 hours. General septicemia.
203 (11)	July 13, 1922, 20 mils.	.....	.....do.....	July 17–Aug. 8, sick, recovered.
204 (12)	.....do.....	.....	.....do.....	July 17–Aug. 7, sick, recovered.

The pigs used in the combination test were about ten weeks old and weighed from 35 to 40 pounds. The anti-hog-cholera properties of the serum were considered of the greater importance, and the first ten days of the test was a straight eight-pig anti-hog-cholera serum test. Two other susceptible pigs, Nos. 201 and 202, were placed in the same pen on the same date, July 6, to be used in the swine plague part of the test which was begun ten days later. As they were to be used to check the virulence of the swine-plague suspension on July 16, they had to be protected against hog cholera without being immunized against swine plague. In order to do this, when placing them

in the pen with the eight pigs of the anti-hog-cholera serum test we gave them 10 mils of stock anti-hog-cholera serum which in the previous rabbit test (see Table 4) had shown no appreciable protective properties against swine plague. On July 13, three days before we began the swine plague part of the test, two more pigs, Nos. 203 and 204, were given 20 mils of the combination serum and placed in the same pen. At the end of the ten days we were certain that the serum had the necessary anti-hog-cholera properties, although our 10 mil pigs (Nos. 193 and 194) were sick. After the test was begun we found that the pigs were badly infested with ascarids.

On July 16 the intravenous injections of 1 mil of suspension of *Bacterium suisepticum* were made to test the anti-swine-plague properties of the serum. Six pigs were used for this purpose; pigs Nos. 197 and 198, which were the 20 mil pigs that had gone through the anti-hog-cholera part of the test pigs Nos. 203 and 204, which had received 20 mils of the combination serum three days before but had not gone through the anti-hog-cholera part of the test and therefore had received no hog-cholera virus (as had 197 and 198), and the two pigs, Nos. 201 and 202, which had been protected against hog cholera with a small dose of stock anti-hog-cholera serum but had received none of the combination serum. The last two pigs mentioned were used to test the virulence of the suspension of *Bacterium suisepticum.*

The results as described in Table 7 indicate that the combination serum had some degree of protective power against *Bacterium suisepticum,* but the difference in effect of the 1 mil dose of bacterial suspension on the four pigs which had received the serum and the two pigs which had not was not striking. The ascarid infestation in this group of pigs was no doubt a factor influencing the effects observed, but until further tests are made the value of a serum of this nature will remain uncertain.

When we turn to the practical application of vaccines we are at once confronted with the fact that subcutaneous injections of large doses of highly virulent cultures of *Bacterium suisepticum* will produce only an uncertain immunity, and this at some risk of killing, disabling or stunting the pigs we wish to protect.

There can be no doubt that large subcutaneous doses of sus-

pensions of the organism at times produce a marked degree of immunity to subsequent intravenous injections of like suspensions. Any person who could have witnessed the results of the trial injection described in Table 1 would have been convinced of that. On the morning following the trial injection the difference between immunized pigs and checks was so striking that it could well have been likened to the "break" in a hog-cholera-serum test. But side by side with this seemingly encouraging result we have the fact that pigs that have not been immunized will sometimes show resistance equal to that of those that have been, and in the individual instance cited we must keep in mind the fact that five weeks after the trial injection one of these same pigs succumbed to intravenous injections of *Bacterium suisepticum*.

The fact that swine plague is rarely if ever a rapidly transmissible disease of farm hogs precludes the necessity for routine immunization. Thus all attempts to immunize against the disease fall in the category of emergency work, and with conceivable exceptions, which are rarely met in actual practice, we must administer the product we use to hogs already low in resistance or to those about to be subjected to devitalizing influences. Under such circumstances a virulent culture is not to be thought of, leaving a choice between attenuated or killed cultures. Will either produce an effective degree of immunity quickly enough and of sufficient duration to warrant its use? Judging from the erratic immunity produced even by large doses of highly virulent cultures, we are unable as yet to see a useful place for swine-plague vaccines and bacterins in practice.

In outbreaks of hog cholera complicated with swine plague, the mortality is measurably higher than is observed in uncomplicated hog cholera. Even transient protection against the effects of *Bacterium suisepticum* produced by a product that would take effect rapidly, and which would be incapable of doing actual harm, would be useful in outbreaks of this kind. Thus we hope that a serum produced from hogs hyperimmunized against both diseases will be of value, but our work with this product has not progressed far, and we do not care to hazard an opinion.

Our best prevention of swine plague at the present time is to keep devitalizing influences or predisposing causes, especially hog cholera, out of the herd.

REMARKS ON "HOG FLU" [1]

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THE OCCURRENCE of diseases which affect the respiratory organs of swine has long been recognized. The visible symptoms which usually result from a pneumonia or pleurisy, or both, are seen frequently in cases of hog cholera, of verminous pneumonia and of swine plague, or what some have seen fit to call hemorrhagic septicemia. It has been commonly admitted, however, that, eliminating those cases which accompany other specific infections, such as hog cholera, the pneumonias of swine occur for the most part as sporadic infections and practically never as herd diseases.

However, in the fall of 1918 there appeared, for the most part in the Middle West, a disease of swine clearly independent of hog cholera and of parasitic infestations, which presented as its chief symptoms labored, jerky respiration, a severe spasmodic cough, fever, and usually great prostration. While this train of symptoms might for the most part be observed in the ordinary pneumonias of swine, the suddenness of the onset, the simultaneous attack on a whole herd, or on a very large proportion of a herd, taken together with the usual prompt recovery within a few days, led many practitioners to conclude that they had to deal with a new disease of swine.

Dr. J. S. Koen, then an inspector in the Division of Hog Cholera Control of the Bureau of Animal Industry, not only recognized this disease as being different from any that he had previous encountered, but was so much impressed by the coincidental prevalence of human influenza and by the resemblance of the symptoms seen in man to those occurring at that time in hogs that he became convinced that the two were actually the same, and he therefore gave the name of "flu" to this new disease of hogs. Subsequent observation has not served to substantiate Dr. Kœn's original assumption that human influenza and "hog flu" are the same. In fact, although the etiology of both diseases remains undetermined, the continued and appar-

[1] Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

ently unabated prevalence of "hog flu," taken together with the marked decrease in human influenza during the past two or three years, leaves little ground for the belief that there is a relationship between the two diseases. The name "flu" as applied by Koen seems nevertheless to be rather apt, it has been generally employed, and we are inclined to continue its use pending a better understanding of the etiology of this disease. We realize that objections have been raised to this name apparently because the same term had been applied previously to human influenza, and for that reason the name "hog flu," as employed by Murray, should be used to avoid confusion.

If we recognize the existence of "hog flu" as a distinct disease it becomes necessary to define its characteristics as sharply as possible in the light of available information. While Koen and Murray in particular have already given excellent descriptions of this condition, there has been some tendency to confusion. Jay, for example, seems to employ the name "flu" synonymously with "thumps," and quite recently in reporting the results of an extended study of the bacteria in normal and diseased lungs of swine, Spray[1] refers to "infectious pneumonia" as being synonymous with "hemorrhagic septicemia" and "flu." As already indicated, we are of the opinion that "hog flu" should, pending further investigation, be recognized as an independent disease, and we offer the following description, based upon our own observations, with the hope that it may aid in a small way to clarify this subject.

Hog flu is essentially a disease of the fall, winter and early spring months. Exposure to cold and dampness with inadequate or cold sleeping quarters seems to predispose to the infection. The onset is sudden and all or a large part of the herd will quickly develop the gravest symptoms. We recall a herd of 102 shoats weighing from 100 to 150 pounds in fine condition on December 3. On December 4 the owner first noticed symptoms of sickness. On December 6 eleven had died and the entire remainder of the herd was so sick that they could be walked among and even kicked without forcing them to move. Recovery is about as rapid and as surprising as the attack. Indeed, in the herd just mentioned, although the loss

[1] Rob. Spaulding Spray, "The Bacteria in Normal and Diseased Lungs of Swine." In *Jour. Inf. Dis.*, vol. 31, no. 1, p. 10, July, 1922.

from death was much greater than in any other herd observed by us, the state of severe illness remained practically unchanged until the sixth day, when there was a remarkable change in the condition. Practically the entire herd was up and eating and a large number were out in the yard moving briskly about and apparently recovered. The disease, therefore, seems to terminate by crisis, although the loss in condition of the recovered animals remaining is very marked.

With reference to the symptoms exhibited by individual hogs, our experience has been that they point almost exclusively to the respiratory organs. Some observers have reported diarrhea as a prominent symptom. Such has not been our experience, although we do not, with our present knowledge, question the occurrence of diarrhea in outbreaks of "hog flu." In our cases the sick hogs exhibited a labored, jerky breathing. At times individuals were seen resting on the sternum with the forelegs extended. Particularly when disturbed, there is a hard paroxysmal cough, which may continue until the hog seems to clear the air passages of obstructing mucus. The temperature is frequently high, 108° F. being observed in a few instances, but this is not uniform. In one herd, apparently a rather mild type of the disease, the temperature ranged from 101.5 to 105.5. Great prostration and complete loss of appetite marked the height of the attack. As stated, recovery from these grave symptoms is rapid and complete, though, depending upon the severity of the attack, some time may elapse before the loss in flesh is regained.

Since the mortality from this disease is low, the practitioner will generally have but few opportunities for postmortem examination. In practically every case of death that has come under our observation we have found congested or hemorrhagic cervical and bronchial glands and a lobular pneumonia of varying extent. The trachea and bronchi usually contain a tenacious muco-pus which may be tinged with blood. In some cases killed for autopsy hemorrhages were visible over the surfaces of the lungs and there was a practical absence of consolidated areas. Other organs show as a rule no departure from the normal, although reddening of the intestinal mucosa, patchy congestion of the kidney and in one case petechiæ on the mucous surface of the bladder have been observed. The death rate from this disease is low. The average probably does not ex-

ceed 2 or 3 per cent. In one herd the loss by death was 25 per cent, but this was quite exceptional.

With respect to etiology we are still much in the dark. Exposure to cold and dampness without adequate warm sleeping quarters seem to be predisposing factors. Murray has reported the isolation of a micrococcus with which he was able to produce symptoms of hog flu in pigs by intravenous injection. Quite recently Spray, during a study of the pneumonias of swine, isolated a streptococcus, which, however, is clearly not the same as Murray's and which proved to be nonpathogenic for laboratory animals. Our own work has thus far led to no conclusive results. At the very beginning we found difficulty in reproducing the disease in pigs.

Blood of hogs affected with "flu" is usually without effect when injected subcutaneously. Intratracheal injection of mucus from the trachea and bronchi of pigs affected with flu has usually been without effect, and suspensions of such mucus as well as suspensions of macerated diseased lung tissue poured into the notrils of healthy pigs have usually failed to reproduce the disease. In a few instances, where exposure by pouring suspensions of mucus from the trachea of affected pigs into the nostrils of healthy pigs was followed promptly by spraying the exposed pig with cold water so as to produce a marked chilling, we have succeeded in inducing symptoms that correspond in all respects to those of "hog flu."

Bacteriological studies have given conflicting and irregular results. We have not been able to isolate the micrococcus described by Murray. From one large herd with typical symptoms there was recovered a small bipolar staining organism which is culturally identical with *Bacillus bronchisepticus*, believed by Ferry to be the cause of canine distemper. We were unable, however, to produce any symptoms of "hog flu" with this micro-organism. Leaving out of consideration *Bacillus coli* and other bacteria which were isolated but which appeared to be of no significance, we may record the isolation of *Bacillus suisepticus* from about 50 per cent of the cases examined, and of a nonhemolytic streptococcus, as yet unclassified, from a like proportion of cases. With pure cultures of the last-named organisms we have thus far been unable to reproduce the typical disease. We are planning to continue our researches through the approaching fall and winter, in the hope that with the aid

of cold weather we may gain more light on the etiology of this puzzling infection.

Inability to reproduce hog flu regularly in experimental animals has prevented any study of specific methods of treatment or prevention, and the present state of our knowledge of the etiology is such that any attempt to prevent or cure the disease by means of vaccines or sera can be carried out only in a haphazard way.

The very low mortality which generally results when only good care is used in handling these herds certainly of itself renders questionable the wisdom of undertaking expensive inoculation with bacterins, vaccines or other biologics. The veterinarian, it would seem, must at least advise his clients of the facts and leave to them the final decision. For our own part we believe that good housing, including warm, well-ventilated sleeping quarters free from drafts and from excessive dust, will be found to be the most effective treatment that can be employed.

In concluding this brief paper we wish again to emphasize the sudden attack on large numbers of hogs, all of which present the characteristic jerky breathing and hard cough, as being the principal diagnostic sign by means of which hog flu may be differentiated from other swine diseases.

DISCUSSION

CHAIRMAN REED: This interesting paper is now open for discussion.

DR. STOUDER: I feel that this paper should receive considerable discussion, because through the Central West—particularly in fall and winter, I think, more than in early spring—we see this condition, have it reported an enormous number of times, and I am confident there is a wide variation of opinion as to the cause of this disease. I can supplement what the authors have said by saying I have seen this disease in only part of a herd, and I am impressed with the fact that practically always the part of the herd that is affected is under bad housing conditions. There are two extremes under which the average Iowa farmer usually houses his swine. One is the house that is extremely drafty, floor draft particularly being a noticeable thing. In the early fall our average farmer will run 100 to 150 young shoats. They do not need much shelter, and when fall comes they go in perhaps to the driveway between the common double crib elevator, and here, with the sliding doors, which seldom fit, the floor drafts are strong. This herd will probably suffer "flu." Three or four sows and their litters, that have access to the good hog house, remain free, and nothing but a wire fence separates the herds. I have frequently seen that condition on a farm.

The other extreme I see very often in the spring is that of a farmer with a hog house that is good. Most of our farmers are prosperous enough to build a good hog house, with cement floor, cemented about two feet up, and a drop siding lumber wall just as tight as it is possible to build. The roof is set on tight, and even

the overhanging, where the lookouts go over, the wall is mortised in with quarter round. This house is adequate in its air capacity, with the usual chimney, to house 20 or 25 mature hogs, or perhaps double that number of immature hogs; but 20 sows with 100 to 130 pigs are housed in here. This house is shut up as a rule, except for a half door at night, and a lot of complications will follow as soon as the hogs get off their feed. Across the barnyard are two or three sows living in a horse barn, absolutely free from this disease. Adequate ventilation, as the author suggests and impresses, without floor draft, is the solution, I am confident, of a very, very high percentage of the so-called "hog flu," which I think is a pneumonia brought on by extremes of condition. I suppose sometimes we find the disease aggravated by the dust these animals are living in.

It is significant to me that, as yet, we are not able to reproduce this disease by inoculation, unless we lower the vitality of the hog. The lowering of the vitality of the hog is the easiest thing in the world, if you go at it right. Just do something that disturbs his respiration. On a cold winter day let him have a cold bed, or let him be in a floor draft, or put him in a hog house that is pretty close and warm, or has two or three chimneys or outlets on the peak that encourage floor draft. That isn't the way to ventilate any building; it encourages floor draft. That is, however, what your average farmer has, and what we need is to pay considerably more attention to the proper ventilation of the hog house.

DR. KINSLEY: I have been very much interested in the paper and also in the discussion. There are two or three vital questions on which, it seems to me, if it is possible to give light on, those who have the information should reveal it at this time.

First: The symptoms as described are very like those of hog cholera. Should this disease occur in a herd of swine that are not immune to hog cholera, how can the practitioner differentiate between "hog flu" and "hog cholera"? As stated, the symptoms outlined consisted usually of a high temperature, inactivity, a tendency for the swine to remain in their beds, which is a very good though brief description of hog cholera. In other words, the two conditions are very similar.

As I caught the distinction intimated by Dr. Niles—I do not know that he stated it plainly—there is possibly this difference: So-called "hog flu" is a herd disease that affects a larger percentage of the animals usually at once than hog cholera. Hog cholera may occur and affect a large percentage of the herd at once, but usually it is not nearly so large a percentage as is found in "hog flu."

In reference to Dr. Stouder's suggestion, I rather doubt if swine, say, five or ten years ago, were better housed than they are today. Did "hog flu" actually exist ten years ago? And yet were the housing conditions then any better than today? If those housing conditions produce or are contributory to the disease today, why were they not contributory then? Would that not seem to indicate that this disease is some infection? It seems to me to point to some infection. But I believe the question of distinction between this disease and hog cholera, clinically, is what is needed at the present time for the practitioner.

I would like also to ask what are the consequences should a herd of swine susceptible to hog cholera be affected with "flu" and be treated with hog cholera serum and virus? What would be the consequences if the practitioner should make the mistake in diagnosis?

DR. STOUDER: There has been a marked increase in the better type of building in which we house hogs in our country. We know this because our Section on Agricultural Engineering has made surveys in different counties in the State and found that there has been constantly an increase in the amount of money spent and the amount

of building, and there has been a marked increase in the housing.

I also remember nine or ten years ago being called into one of our southwestern counties, and I, no doubt, ran into a case of "hog flu." I diagnosed it as hog cholera. Conditions there led me to say to the owner: "My advice is to get a veterinarian to immunize your hogs as soon as you can." For some reason, I think lack of opportunity to get serum, they never treated that herd of something over 100 head of hogs, and they never lost but two. To this day, if I meet that man or any of his neighbors, they have a good deal of sport telling me my statistics on hog cholera are away off. I evidently struck something of this character. Hearing the history, seeing the herd, finding evidences of some constipation, and some pigs showing evidences of diarrhea, with a high percentage, nearly half, lying about on the sternum, hardly able to move, and with no opportunity for postmortem, I felt very certain of hog cholera and so advised this owner. But today I am in bad repute in that community as a diagnostician. I evidently made a mistake.

We have, however, had a great increase in the type of tightly constructed hog house that we have built in our country for the last ten years, because there has been a wonderful amount of work done on drawing plans and assisting the farmer in devising types of hog house. The increase in swine as a continuous livestock proposition has brought about very much better hog houses, as some of our county surveys show, in the last five or six years than there were previous to that time.

I have often made the statement—and I have yet to have anyone show me that it is erroneous—that I do not believe a herd of hogs ever suffer from this disease if they live in a low-hung cattle shed that is deeply bedded with straw. I have not happened to see it in that type of building, where there is a long overhang of the roof and plenty of room for the herd to go in and lie in. But they are affected by this disease where we put them in the average hog house, a tight building with air doors on the roof, or no ventilation, a roof that will get frosty in the winter and drip water. We see it very frequently then, particularly if we have heavy, foggy weather, if we have high winds, or if we have a reasonably warm day, as we do in October, with temperature running up quite high and then pretty cool nights.

I remember about four years ago this disease was reported to us by long-distance telephone from pretty nearly all parts of Central Iowa. In November, the first or second week, we had high winds for about thirty-six hours, and this disease was everywhere immediately after.

I remember seeing it last winter in a herd of hogs that were housed in a shed that was as loose as could be; but in a herd of hogs living in a shed of much the same type, down in the valley, there was not the least bit of trouble. I feel sure it was superinduced by exposure. Perhaps infection does give us the lesion that is found in the lung, and gives symptoms especially of temperature and depression, and things of that kind; but it must be assisted, I believe, by physical exposure.

DR. CAHILL: I think Dr. Niles's report on "hog flu" brings two or three very, very pertinent points point-blank before this Association. It seems to me that the most important of all is an official or a semiofficial admission that swine suffer with diseases other than hog cholera. If his paper did nothing other than to convince the practicing veterinarian that every case of disease he sees in swine is not hog cholera, then this meeting has made one big, long stride, and I hope that it goes to the utmost corner of every State in America. It is a pretty serious state of affairs when we come to the conclusion that an animal can be affected with only one disease.

It is because of that opinion, held by some of us during the past few years when sickness in swine has been so much more prevalent, that veterinary practice is being discredited, and that a great deal of discredit has been thrown on simultaneous treatment of hog cholera.

I believe Dr. Niles did not mention, although he has previously told me, and Dr. Dorset has previously told me, that this condition is practically as prevalent in immune hogs as in susceptible hogs. I am not sure that is in the paper, but I have been advised of that by both gentlemen. If that is so, we have another important factor before us. Is it not possible, I would ask Dr. Niles, that some of the cases of vaccination trouble, particularly in the heavy hogs that are supposed to be immune to hog cholera and are later diagnosed as hog cholera, are really "flu," and the simultaneous treatment is being discredited in this manner?

There is one thing that is not clear to me, and I say this after being favored with a long talk with Dr. Dorset on the subject recently. I would like to know how we are going to differentiate, clinically, between so-called "flu" and so-called "protein poisoning" as given by another Bureau of Animal Industry employee. The symptoms given as "hog flu" are identical with the symptoms given by Jay as "protein poison." The onset is extremely sudden, inappetence is mild, mortality is low, and animals recover with practically no treatment if moved to sanitary quarters and diet changed. If the animals are not given any food for a few days, recovery is complete. I would like to differentiate between the two.

Any of us who are privileged to examine large numbers of specimens from field cases of sickness in swine are undoubtedly united in one thing, and that is that you can take any set of symptoms and you will not have uniform postmortem findings, you will not have uniform bacteriological findings for more than two months. By this I mean that you may examine specimens from any section of America and you may find *B. suisepticus* for a period of one or two months, and, without any warning, there is a complete change; you will get nothing but a streptococcus.

While Spray was working with his specimens he came in contact with one of the intermediate organisms almost constantly, and he was unable to get another culture from the same identical specimen. He came constantly in contact with a streptococcus. Other laboratories in Indiana had the same experience, and when a few of us were privileged to meet and discuss this, we found that for a period of one to two months we all obtained from our specimens an organism of the streptococcus. Then at approximately the same time, from cases showing the same pathological changes, we all obtained *B. suisepticus*.

It seems to me, in view of those circumstances, that before we become very enthusiastic regarding "flu" we must realize that without the symptom changing, the etiological factor of diseases of swine apparently does change.

DR. QUINN: Dr. Cahill, I believe, has expressed the opinion of a good many practitioners who are meeting this condition in the field, not in winter alone but throughout the year, under most discouraging housing conditions and under most ideal housing conditions. In hogs, regardless of simultaneous immunity or other treatment, the consensus of opinion is narrowing down to the fact that diet is a very essential factor in the occurrence of this disease. Some of the arguments that have been put up in favor of a dietary cause of this trouble are: First, that the disease is extremely rare as a specific condition in suckling pigs on a balanced ration of milk. Second, it is most common in pigs that are forced fed or in over thrifty conditions, on exhibition at State fairs, swine shows, etc. The condi-

tion as Dr. Stouder has stated is very uncommon in pigs that must forage some distance for a living, that are kept in the open and are as a rule not in an overly fat state. The third reason for a dietary cause of this trouble is that the period of incubation, as a rule, is not manifest. In herd after herd that is normal and well today, tomorrow 90 per cent show a very aggravated trouble. There is not the initial loss of pigs or the initial manifestation of trouble that you get with hog cholera or any of the so-called bacteriological diseases of swine.

The treatment itself is also conclusive in some ways of the diet relation to this trouble, because if these pigs are immediately taken and subjected to a good, thorough purgation, recovery is much more prompt. The mortality in this condition is not parallel with any bacteriological trouble that we are at present acquainted with. Taken all together, the absence of a period of incubation, the usual presence of forced feeding, or exhibition under conditions that will constipate, are predisposing factors, at least, to this trouble.

The disease, to most veterinarians, does not seem hard to differentiate from hog cholera, because of the fact that the trouble is confined to the respiratory tract and the symptoms are those of acute edema of the lungs. The cough is deep seated and moist, and the excretion from the eyes is not usually present in the pigs. The temperature is variable and constipation in almost all instances is marked. The postmortem findings are usually a very extensive edema of the lungs.

DR. KELSER: I would like to ask Dr. Niles if any special efforts have been made to isolate organisms of an anaerobic nature. I raise that point in view of the recent findings of the Rockefeller Institute in connection with "flu" in man. They have recently isolated an organism which they hope to prove the cause of "flu" in man. That organism is one which will pass, in certain stages, the various bacteria-retaining filters. It is found only in the early stages of the disease. Irrespective of whether they find this organism to be the true cause of "flu" in man, it points out the necessity of going into the bacteriology from an anaerobic standpoint in the study of some of these "flu" diseases of animals. In view of the analogy between influenza of man and horses and so-called "swine flu," it appears to me that we have been giving too little attention to the possibility of anaerobic infection. The possibility exists that something of that nature might be found in some of these "flu" diseases of animals that have been giving us considerable trouble.

CHAIRMAN REED: I will call on Dr. Niles to sum up the discussion and to answer the various questions as he sees fit.

DR. NILES: This "hog flu" is certainly a most vital question, and the authors of this paper do not claim to know any more about it than anybody else.

In answer to Dr. Kinsley's question, the sudden onslaught of the disease, a large number of the herd being attacked, and the jerky respiration, serve to differentiate between that and hog cholera. When you first go to a man's place and see the herd, it does look very much like hog cholera that has been allowed to run until every animal has become sick. I do not doubt that there are cases where you might not be able to differentiate simply by medical symptoms. As Dr. Cahill said, immune herds are attacked the same as nonimmune herds.

Dr. Stouder gave a most excellent description of the symptoms of this "flu" as we see it in Iowa. The fact was not brought out in the paper that the disease is on the increase in the Middle West, particularly in Iowa. We saw and heard much more about "hog flu" last fall than we ever heard before in Iowa. In many counties practictioners have reported that 90 per cent of the herds had been attacked with "hog flu." I am not sure but what possibly the disease is be-

coming a little more settled. I believe the mortality is a little less than it was before. We saw one herd in which 25 per cent of the animals died. The blood from this herd was injected. The symptoms and lesions did not indicate hog cholera in this herd.

Answering Dr. Kelser, we did some work in attempting to isolate the anaerobic organisms, but I do not think the work was extensive along that line. I know some work was done, but we have not so far been able to secure material enough to make extensive studies of this disease. When you hear of this disease some distance from home, by the time you get there perhaps the hogs are largely recovered. and not being able to reproduce the disease, we have not been able to continue the study.

It is a puzzling question as to why we did not hear more of this disease prior to the last few years. I have no doubt that it did occur, but we did not have much of it before we had the appearance of "flu" in people. I do not think they have any connection, but that was about the time of its appearance, and it is becoming more prevalent, and I think we will hear of a lot more of it in September, October and November.

While it is true that something very similar appeared in hogs exhibited at the fair. I do not know whether it will develop at the State Fair of Iowa or not. I do not know whether that is the same thing, but it resembles it.

One gentleman referred to the housing, ventilation, etc. I do not think that cold is anything more than a predisposing factor. Cold weather seems to act as a predisposing factor. I do not know why this infection is more widespread now, but it does look as if the hog was harboring some organism which is stirred into activity by change in atmosphere.

One of the herds that showed the most signs was a herd that ran in the cornfield and slept at night in the field. It was the habit of the hogs to stay out there both night and day. It is the practice of hogs that are being turned into cornfields to stay out in the field, sleep in the field and not come into the hog house until the weather gets severe. The herd showing the most characteristic symptoms was a herd housed in this way. In November, one rainy day, these hogs slept out, and two days later they developed symptoms of "hog flu," and about 10 per cent of them died.

There are a lot of questions that may be asked that we do not know anything about. We hope that we may make some discovery along these lines; we hope to find out something about the etiological factors. In the meantime we present these observations for what they are worth.

A directory of Belgian veterinarians published by the *Annales de Médecine Vétérinaire* shows 695 civilian and 99 military veterinarians. Eleven of the latter are on the retired list and 4 are on special service in the Congo.

An English butcher has found a number of old coins in the stomachs of bullocks slaughtered after grazing on certain marsh lands, the dates on the coins ranging from 1674 to 1806, so says our veracious contemporary *The Veterinary Record.* This may give a clue to the location of Captain Kidd's buried treasure.

THE ROLE OF THE UDDER AND ITS SECRETION IN BOVINE INFECTIOUS ABORTION [1]

By WARD GILTNER, I. F. HUDDLESON *and* R. L. TWEED
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INFECTIOUS ABORTION of cattle is not only a disease of great economic importance but it is a stupendous problem or an aggregate of subproblems of much scientific interest. We are not by any means in total darkness as respects the problem, but there are many of the subproblems that are much in the shadows of ignorance or misinformation. It has been known for some time that *Bacterium abortus* finds the udder of the cow a suitable habitat and that the organism persists in the udder in some cases more or less permanently. These are very significant facts from a practical standpoint, and it is the purpose of this paper to discuss the various aspects of these facts and their probable or known significance.

Obviously the things that are of importance or the questions that need answering in this connection include the following: How does the germ get into the udder? Why does it establish itself there in some cases and not in others? When does it appear in the udder? How long does it persist under various conditions? What changes, structural or functional, local or general, is it responsible for? How numerous are the abortion bacteria in the milk? Are they virulent or nonvirulent, and why? Do they invade the system, including the uterus, pregnant or nonpregnant? What part does milk play in the spread of infectious abortion to cattle? To swine? To any other species of animals? Is raw infected milk in any sense dangerous to man, and if so, under what conditions? If milk from infected cattle is important in the spread of the disease, what steps may be taken to eliminate or minimize the danger? These and other questions of similar or lesser importance have been answered more or less satisfactorily or need answering urgently. It appears to us that the solution of the bovine infectious abortion problem is dependent on a knowledge of the part played by the udder and its secretion in the event that this factor is either of great importance or of no importance. Its importance must be

[1] Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

established, else our efforts to control the disease will reflect the confusion in our minds on this one probable source of trouble.

EXPERIMENTAL STUDIES

That *Bacterium abortus* is excreted with the milk has been shown by Schroeder and Cotton (1),[1] Fabyan (2), Zwick and Krage (3), Cooledge (4), Evans (5) and others. Cooledege (4), Evans (5) and Huddleson (6) have studied the cultivation of *Bacterium abortus* from milk. The last named seems to have come nearest to a successful and practicable method and incidentally to have thrown light on both the fundamental physiological requirements of the organism and the fact that these requirements are peculiarly met in the udder.

Huddleson (7) has had a high degree of success in cultivating *Bacterium abortus* in an atmosphere of 10 per cent carbon dioxid, which is probably the CO_2 tension inside the udder, since freshly drawn milk from the healthy udder shows approximately this pressure of CO_2. He has also determined the optimum pH for the growing of the organism, namely, 6.6. With the improved methods of cultivating the organism from milk it appears certain that it occurs in very limited numbers even in the most pronounced cases. In making a bacteriological study of several carriers he found that the number of organisms in a given sample would vary from one to about 200 colonies. This represents the number of *Bacterium abortus* in one-half of the sediment of a 10 c.c. sample. This, of course, is not an accurate measure of the total number present, but nevertheless it gives us sufficient information for speculation.

Fleishner, Vecki, Shaw and Meyer (8) infected goats with *Bacterium abortus* and report the subsequent finding in the milk of 100,000 to 250,000 viable organisms per cubic centimeter. The finding of this number of *Bacterium abortus* in the milk of goats, however, is not a criterion of the number present in cow's milk.

How the germ gets into the udder under natural conditions is a matter of conjecture. Except for the report of Schroeder and Cotton, no one has yet been able, experimentally, to introduce the organism through the teat duct and thereby establish a carrier state in the udder and produce changes similar to or

[1] Figures in parentheses following authors' names refer to bibliography at end of paper.

identical with those found in natural infection in so far as we are able to determine. Since it has been determined that the germ may and probably does travel in the blood stream, it is only reasonable to conclude that it is taken out by the udder, conditions being anatomically possible and physiologically favorable. How to keep the bacteria out of the udder is, of course, the whole question, and resolves itself into the prevention of general infection in the cow and possibly the prevention of entrance into the teat duct by the obvious practices of sanitation. Why the udder is not always affected or affected to the same extent is only a matter of speculation.

Whether the udder infection is the primary or one of the secondary manifestations of the infection in the animal is not known, but probably cases of both types occur. The matter is of practical importance, since upon it hinge such questions as whether the udder infection is or may be frequently only a minor local affection or whether it constitutes a standing menace to the pregnant cow as a storehouse from which the germs may invade the body at any unfortunate time. Next in importance to the prevention of a general infection in an animal is how to destroy the organism in the udder once it is established. The solution of this question will probably mean the control of the spread of infectious abortion. In the line of direct experimental evidence, Schroeder and Cotton (9) have found *Bacterium abortus* in the lymphatics draining the udder, thus indicating that its presence in the udder is a menace to the body, more specifically to the pregnant uterus. On the other hand, the germ seems to persist in the udder indefinitely in some cases which regularly avoid any troubles of conception or parturition. The persistence of *Bacterium abortus* in the tissues of the udder is probably due to the establishment of an equilibrium between the organism and the ability of the body cells to produce sufficient bactericidal substances for its complete destruction. What factors influence the entrance of the germ into the udder other than referred to, its persistence there or its complete or partial elimination from that organ are undetermined.

The changes produced in the udder seem to have been sought by Schroeder and Cotton (10) at autopsies with negative results. Cooledge (4) showed that milk from infected udders contains agglutinating and complement-fixing antibodies for *Bacterium abortus*. In a few cases it appeared that these antibodies

occurred in the absence of infection, so that the question arose as to whether they may not have been produced systemically and excreted with the milk. In other cases it seemed quite clear that they were produced locally. Cooledge (11) also undertook to determine the significance of the cell count in infected udders. He concluded that a high cell count together with a high antibody content indicated an infection, since such milk as a rule suffices to produce the disease in guinea-pigs upon intraperitoneal injection of 5 c.c. quantities. He did not undertake to determine the source of the cells.

Later work by Tweed (12) indicates that cows' udders which carry an active infection have abnormally high cellular counts and that the cells found in the milk from these actively infected udders are mostly leucocytes and not epithelial cells as contended by Hewlett, Villar and Revis (13). These leucocytes probably come from the blood stream, as a very close relationship has been found to exist between decreasing hydrogen-ion concentration of the fresh milk and an abnormal number of leucocytes. Baker and Breed (14) attribute this decreased hydrogen-ion concentration to the entrance of the alkaline substances of the blood into the milk, together with other substances found in the blood stream. During the past year O. H. Friedeman (15), working under the direction of Tweed, undertook to determine the pathological changes that take place in an infected udder. He worked under very carefully controlled conditions with only one positive udder and one negative control, and his results were negative in so far as histo-pathological changes were concerned; or, to put it in another way, he found nothing in sections of the one that he did not find in sections of the other udder. His sections show leucocytes in the lumina of the alveoli, thus indicating their hematogenous origin. Otherwise his results confirmed those of Cooledge (11). While his work was not sufficiently extensive to warrant general conclusions, it is not such as to convince one that *Bacterium abortus* udder infection is attended by detectable gross or microscopic alterations such as catarrh or abscess formation. The hope of finding such alterations rests on the basis of the relatively small number of cells (assuming them to be pus cells) in the milk reported by various workers.

Another fact that throws doubt on the possibility of finding lesions in so-called infected udders is the very small number of *Bacterium abortus* found in milk. Recently we have succeeded in

isolating *Bacterium abortus* directly from whole milk. The number isolated averaged 80 per cubic centimeter of milk.

In this connection it is interesting to note the work of Evans (16), Meyer and Shaw (17) and Kahled (19), an effort to show the relationship between *Bacterium abortus* and *Micrococcus* (*Bacterium*) *melitensis*. The two organisms are undoubtedly closely related, but there remains a distinct difference between their invasive properties. This fact is clearly demonstrated by the differences in the length of time required to produce an infection in experimental animals with either of the two organisms. According to Fleishner, Vecki, Shaw and Meyer (8), the ingestion by monkeys of virulent *Bacterium abortus* supplied in the naturally infected milk of a goat may lead to a generalized invasion of the tissues and even the heart blood, while the ingestion of abortion bacilli of a low virulence in small numbers does not lead to an infection even when fed for 30 days.

From previous investigations it appears that the inability to produce an infection in animals by feeding milk naturally infected with *Bacterium abortus* is due to the small numbers of organisms present. Our studies as well as those of Evans (5) indicate this to be a fact. In fact, according to the report of Shaw (19), cows infected with *Bacterium melitensis* eliminate very few organisms in the milk. That naturally infected milk will not lead to an invasion of the tissues of calves or swine has been clearly demonstrated in the experiments of Huddleson (20, 21), Hayes (22) and Simms and Miller (23), and in humans by the experiments of Colledge (24). The latter also added pure cultures to milk and fed it to human subjects with practically negative results. The cultures of Cooledge may have been of low virulence, however. Huddleson (25) and Meyer, Shaw and Fleishner (26) have recently demonstrated the difference in pathogenicity of strains of *Bacterium abortus* for guinea-pigs. A knowledge of the pathogenicity of strains is certainly essential in experimental studies.

The virulence of the organism found in milk is demonstrated by the work of all the early workers who used guinea-pigs as the test reagent for determining the presence of the germ in milk. But again virulence for guinea-pigs may not be equivalent to virulence for cattle, man or swine.

In summing up all of the data which have accumulated on the subject, we can say only that there is no positive evidence

to warrant the assertion that milk from an udder carrying *Bacterium abortus* is an important factor in the spread or transmission of bovine infectious abortion. This statement does not apply to the infected udder as respects its ability to release organisms to the circulation, either blood or lymph. That carrier cases (those that carry the germs in the udder but do not abort) repeatedly show the organism in the uterine exudate at parturition has been observed by Schroeder and by us. Such cases are no doubt the prime source from which many infections originate. This condition is not apparent to the breeder, and such cases are given little or no attention before or after parturition. To us the carrier state appears to be one of the most important problems in the study and control of infectious abortion. The application of biological preparations or chemicals to alleviate such a condition has apparently been given little attention. We are studying the use of vaccines with this phase of the subject in view, but the success thus far obtained can not be considered encouraging.

The elimination of infectious abortion can not be expected until a successful method has been obtained for the prevention and cure of the carrier state. Before this can be accomplished a thorough study must be made of the factors involved in the passage of *Bacterium abortus* from the circulatory systems to the udder and in the opposite direction, and the factors which lead to the persistence of *Bacterium abortus* in certain tissues, such as the udder.

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THE CHARACTER AND POSSIBLE SIGNIFICANCE OF THE BANG ABORTION BACILLUS THAT ATTACKS SWINE [1]

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IT IS MY BELIEF that until a few years ago most investigators who had studied the abortion bacillus of Bang were of the opinion that it was not a factor of importance except for cattle. Early investigations indicated that swine were rarely if ever infected with it. McFadyean and Stockman in their Report on Infectious Abortion in Great Britain, 1909, expressed the opinion that bovine abortion is essentially a disease of cattle, and, although other species can be experimentally infected, they are not likely to contract the disease in practice excepting as the result of gross carelessness in the disposal of infected material. I believe that for many years most investigators shared this opinion.

In our earlier work Dr. Schroeder and I tried to produce abortions in pregnant sows by the injection of *Bacillus abortus* in both cultures and tissues, but failed in every case to do so. We were able to infect boars by the intravenous injection of large quantities of suspensions of cultures of *B. abortus*, but the infections were only transient. In these cases we injected a number of boars, and killed one each week, up to and including the fourth week following injection, and also at the end of the eighth, fourteenth, eighteenth and twenty-second weeks, and tested their organs for *B. abortus* by guinea-pig inoculations. We were able to recover the abortion bacilli from the boars up to and including the eighth week but not beyond. The organs tested for these bacilli were liver, gastrohepatic glands, epididymides, seminal vesicles, inguinal glands and Cowper's glands. Abortion bacilli were at different times recovered from all of these. These results led us to conclude that the tissues of boars were not ordinarily favorable habitats for the abortion bacillus. We were, however, working with strains of the organism isolated from cattle.

[1] Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

Connaway and his associates (Infectious Abortion in Swine, 1921) pointed out that Traum isolated *B. abortus* from the aborted fetus of a sow while working in the Pathological Laboratory of the Bureau of Animal Industry in 1914. Two years later Good and Smith, of the Kentucky Experiment Station, reported that they had isolated the organisms from aborted swine fetuses. The year following Connaway, Durant and Newman published the findings of their serological studies on aborting swine. Since then all of the above investigators and others, including Hays and Davis in California, Graham in Illinois, and Doyle and Spray in Indiana, have contributed to our knowledge of abortion disease in swine.

Early in 1919 Dr. Clark Hays, who at that time was in charge of the hog cholera eradication work of the U. S. Bureau of Animal Industry in Indiana, reported an outbreak of abortion among sows in that State, and sent discharges from one sow to the Pathological Division of the Bureau for examination. From these discharges Dr. J. M. Buck isolated an organism apparently identical in nearly all respects with *B. abortus*. Dr. Hays reported that the aborting sows were bred very soon after they aborted, and that some aborted a second time.

Dr. Schroeder and I obtained from Dr. Buck a culture of the organism noted above. This culture grew more luxuriantly than the strains of abortion bacilli, isolated from cattle, which we had studied, but serologically and microscopically was identical with them, being agglutinated in the same dilutions by both cattle and hog sera, as were the strains isolated from cattle. When tested by guinea-pig inoculations, however, we found that there was a distinct difference in the lesions produced. The former was the more virulent for guinea-pigs, and produced in them certain lesions which we had not before observed in guinea-pigs inoculated with *B. abortus*. We thought at first that some contamination in the culture, either acting alone or in symbiosis with *B. abortus*, was responsible for the unusual lesions, but repeated inoculations of cultures and guinea-pigs convinced us that this was not the case.

The strains of *B. abortus* isolated from cattle, which we have studied, seldom produce necrotic lesions at the site of inoculation or in the adjacent lymph glands, when the inoculation is made in the inguinal region; but the Indiana abortion germ when similarly inoculated causes enlargement and usually necro-

sis of these glands, the glands often being converted into sacs filled with semifluid neorotic material. Other lymph glands, notably those of throat and lumbar regions, are very often affected in the same manner. Enlarged lymph glands are not at all uncommon as a result of infection with *B. abortus* isolated from cattle, and small necrotic foci are occasionally found in them, especially in throat and sub-lumbar regions, but the glands are not converted into large sacs filled with semifluid necrotic material as in the guinea-pigs infected with the Indiana swine germ. The lesions of the epididymides are much more marked and occur in a larger proportion of the guinea-pigs inoculated with the Indiana abortion germ than with those isolated from cattle. These organs are converted into enormous sacs filled with semifluid necrotic material. Guinea-pigs having diseased epididymides, resulting from infection with *B. abortus* isolated from cattle, usually show the contents of the seminal vesicles to be opaque white, but we observed no lesions in the vesicles. The Indiana swine strain, however, sometimes causes abscesses to form in the bases of these organs.

The most characteristic lesions produced in guinea-pigs by the abortion bacillus isolated from swine, however, are those found in the spleen and liver. In the former organ the lesions produced by the abortion bacillus isolated from cattle consist of a uniform enlargement or an enlargement with elevations of the same color as the balance of the organ. Gray areas of solid necrotic material are sometimes found within the organ and often the capsule is thickened. The lesions caused by the abortion bacillus isolated from swine are at times like those described above, but usually are distinctly different. The organ is enlarged and contains spherical nodules varying in size from 1 to 7 mm. in diameter. On section these nodules are found to be filled with semifluid, odorless, necrotic material, identical in appearance with that found in the epididymides.

Many strains of *B. abortus* isolated from cattle do not commonly cause lesions in the liver. When lesions are produced they closely resemble those of tuberculosis—small, irregular, yellowish gray areas gradually merging into the surrounding normal tissue. Lesions of the liver are quite common in guinea-pigs infected with *B. abortus* isolated from swine, but they usually consist of the spherical nodules before described as occurring in the spleen.

In our preliminary study of the strain of *B. abortus* isolated from swine and those isolated from cattle, we observed no other differences than those already mentioned. A year later, in 1920, we received from Dr. Robert Graham of the University of Illinois a culture of *B. abortus* which he had isolated from an aborting sow. We found this organism to behave culturally and serologically the same as that isolated from the Indiana sow. Guinea-pigs inoculated with it showed the same character of lesions, but the lesions were more marked, the organisms seeming to be more virulent than the one from Indiana for these animals. Unusual lesions made their appearance, or, to be more exact, lesions appeared in an unusual place, in some of the guinea-pigs that had been inoculated with subcultures of the *B. abortus* received from Dr. Graham and which for convenience we will call the Illinois swine *B. abortus*. The lesions consisted of spherical nodules filled with semifluid necrotic material identical in appearance with those already described as occurring in the liver and spleen. These were usually found in the depths of but occasionally directly beneath the orbits, and in one case were found at the base of the ear. Sometimes both eyes were found to be affected, at other times one. These nodules often become so large that they cause the eyeball to protrude very much and destroy the sight. Pure cultures of *B. abortus* were obtained from these orbital nodules, and guinea-pigs inoculated with the necrotic material from the nodules showed the usual lesions produced by *B. abortus* isolated from swine. The proportion of guinea-pigs showing these eye lesions in one series of 41 of these animals, inoculated with fetal and placental tissues from swine and a cow which were infected with the Illinois swine *B. aboruts* by means of cultures, was 40.6 per cent, and in another series of 105 inoculated directly with cultures of the same organism the percentage was 29. This indicates that growth on artificial culture media reduces the organism's virulence for guinea-pigs, but that it is restored by passage through swine or cattle. Eye lesions do not usually make their appearance before 8 or 10 weeks after inoculation. Cultures obtained from orbital nodules, or the spleens of guinea-pigs showing such nodules, do not cause eye lesions more commonly than cultures obtained from guinea-pigs with unaffected eyes.

In the thousands of guinea-pigs which we have inoculated with many different strains of *B. abortus* from cattle within the

past dozen years, we have not observed the eye lesions described above. Smith and Fabyan[1] describe eye lesions which they found in guinea-pigs which they had inoculated with *B. abortus* in their earlier work with this bacillus, but so far as we are able to judge from their description they were unlike those which we have found.

Further work with the Indiana strain of swine *B. abortus* showed that this organism at times produced the same kind of eye lesions in guinea-pigs as did the Illinois strain, but not nearly so often.

We obtained a culture of *B. abortus* from Dr. Traum of the University of California, which he had isolated from an aborting sow in that State. We found that this culture also produced eye lesions, and in other respects seemed to be the same as the Illinois strain, but was somewhat less virulent for guinea-pigs.

We are now studying three strains of *B. abortus* obtained from Dr. Connaway of the University of Missouri and isolated from outbreaks among swine in that State. All three produce the same spleen and liver lesions as the Indiana, Illinois and California strains, and one of them also produces the eye lesions. Sufficient inoculations have not been made from the other two strains to determine whether or not they will do this.

In the production of bone lesions in guinea-pigs the strains of *B. abortus* isolated from swine seem to be much more potent than those isolated from cattle. In one series of 105 guinea-pigs inoculated with cultures of the Illinois swine strain, 29.7 per cent developed bone lesions, and in another series of 23 guinea-pigs inoculated with placenta and fetal tissue of sows infected by feeding cultures of the Illinois strain of *B. abortus* over 45 per cent developed bone lesions. Here again we have evidence that the *B. abortus* causing abortion in swine is more pathogenic for guinea-pigs when growing in the placental and fetal tissues of swine than when growing on artificial culture media. Of 124 guinea-pigs inoculated with placental or fetal tissue of aborting cows, 11, or 8.9 per cent, developed bone lesions.

We have never observed bone lesions so gross in guinea-pigs inoculated with *B. abortus* isolated from cattle as were a num-

[1] Centralblatt fur Bakteriologie, Abt. 1, vol. 61, no. 7, 1912, and Jour. Med. Research, vol. 26, no. 3, 1913.

ber of those produced by the Illinois hog abortion strain. This organism not infrequently caused one or more ribs to be enlarged for their entire length, sometimes to four times their normal volumes. On sectioning one of these ribs it was found to consists of a very thin shell of bone enveloping a mass of semifluid necrotic material, the cancellated portion having entirely disappeared. Paralysis due to diseased vertebræ is not uncommon, and it is invariably the lumbar vertebræ that are affected. The lesions in these seem to begin as erosions at the inferior portions of the articulating surfaces and to continue till a large cavity between the two vertebræ is formed. This is usually filled with the semifluid necrotic material already described.[1]

Of the six strains of *B. abortus* isolated from outbreaks of swine abortion in the four States, thus far stulied at the Experiment Station, all produce certain lesions in guinea-pigs unlike those produced by the ordinary strains of *B. abortus* isolated from cattle. All of the swine strains seem to be closely related and differ only in the volume of lesions produced, but not in kind. The Illinois strain seems to be the most virulent for guinea-pigs, the Indiana the least so, and the California intermediate between the two. We have not as yet determined the relative virulence of the three Missouri strains. It is quite likely that the difference in virulence may be due to length of time the organisms have grown on artificial media. The Indiana strain has been isolated between one and two years longer than the Illinois strain.

The important point about these observations which I wish to impress is that we have studied a number of strains of the Bang bacillus isolated from outbreaks of abortion among swine, and that all the strains are somewhat unlike those isolated from cattle in factors in which they closely resemble one another.

EFFECTS OF THE SEVERAL STRAINS ON SOWS

In order to determine if cultures of *B. abortus* isolated from swine would cause abortion in sows, several feeding experiments were undertaken. The first one concerned two pregnant sows each of which was given suspensions of cultures of the Indiana

[1] Fabyan describes bone lesions in guinea-pigs inoculated with one strain of *B. abortus* which he isolated from a cow which approaches closely some of the bone lesions here described.

swine strain in four feedings several days apart. One of the sows, No. 3153, gave birth to a litter of 10 pigs 50 days after the first feeding and 25 days after the last, all of which lived. The other sow, No. 3154, gave birth to 14 pigs 89 days after the first feeding and 64 days after the last; three of which were stillborn and two died the day after birth. Guinea-pig inoculations from the organs of the three stillborn pigs were negative. No other inoculations were made, as the afterbirths from both sows were lost.

A month after parturition the serum of sow No. 3153 gave a positive reaction to the agglutination test in dilution of 1 to 100, and that of sow No. 3154 in 1 to 50. Four months later their blood reacted in the same dilutions. A year later both reacted in dilutions of 1 to 100. A boar was placed with them soon after, and fifty days later the agglutination titer of the serum of No. 3153 had risen to 1 to 200, while that of 3154 had fallen to 1 to 50. No further blood tests were made until the boar had been with the sows for about six months, when the blood of 3153 reacted in a dilution of 1 to 800 and that of 3154 showed a slight reaction only in a dilution of 1 to 50. The sows were killed immediately after the test was made, and autopsy of sow No. 3153 showed her to have been suffering from a severe metritis. The walls of the uterus were greatly thickened and impregnated with purulent material. The uterine cavity and Fallopian tubes contained a purulent exudate. The kidney fat showed the presence of kidney worms and several necrotic areas containing material similar to that found in the epididymides of guinea-pigs affected with abortion disease. Guinea-pig inoculations were made from the uterine exudate, portions of the uterine walls, necrotic areas found in the kidney fat and udder tissue. All of these tissues were proved by these inoculations to contain living abortion bacilli.

The uterus of sow No. 3154 contained several fetuses about half term, apparently normal. Guinea-pig inoculations made from these were negative.

Evidently sow No. 3153 had aborted as a result of *B. abortus* fed more than a year earlier. The organisms seem to have become active at least four months before she was killed, as the agglutination titer of her blood had begun to increase at that time. The metritis may be attributed to retained afterbirth. The kidney fat may have become infected through the Fallopian

tubes. The *B. abortus* isolated from sow No. 3153 was identical with that fed a year earlier.

A second feeding experiment was made with the same strain 18 months after the first. In this, three pregnant sows were fed cultures of this strain of *B. abortus* on six consecutive days. These sows all produced apparently normal litters, 66, 79 and 89 days respectively after the feeding, and their blood remained negative to the agglutination test. It is not surprising that this culture was of low virulence for sows, since it had been in guinea-pigs and on artificial culture media for over three years.

ILLINOIS STRAIN

Six sows were given three feedings of culture of the Illinois swine strain of *B. abortus* within five days. One of these, No. 3347, aborted 35 days after the first feeding. *B. abortus* was recovered from the fetal organs and membranes by guinea-pig inoculations. The lesions produced in the guinea-pigs were very great, and many of the animals developed orbital nodules. The agglutination titer of the sow's blood, when she aborted, was 1 to 50; it had risen to 1 to 200 a montth and a half later, but had dropped to 1 to 50 four months after that. Four of the sows gave birth to apparently normal pigs as follows: Two 62 days, one 52 days and one 92 days after the first feeding. The remaining sow proved to be not pregnant. The blood of one of the four sows reacted to the agglutination test in a dilution of 1 to 100 at the time of parturition and that of another in dilution of 1 to 50. The two remaining sows were negative to the test. The two sows that reacted were negative a month later.

Three additional pregnant sows were each given six feedings of culture of the Illinois strain of *B. abortus* on as many consecutive days. The culture was one recovered from aborting sow No. 3347 before noted, and had been grown for but two transfers on artificial media since its isolation from guinea-pigs inoculated with fetal organs of the aborting sow. One of these sows aborted 35 days after the first feeding. *B. abortus* was recovered from both fetal organs and membranes, and her blood showed an agglutination titer of 1 to 50 at this time. A week later it was the same, but two months after the abortion it had risen to 1 to 400, at which point it remained a month later. A second sow aborted 37 days after the first feeding, but the fetuses and membranes were lost. Guinea-pigs inoculated with material swabbed from her vagina were negative and her blood

remained negative to the agglutination test. The remaining sow gave birth to five apparently fully developed pigs, which were dead when found, but gave evidence of having been born alive, 89 days after the first feeding. Guinea-pig inoculations of the organs of the dead pigs were negative. The blood of the sow showed an agglutination titer of 1 to 200 at this time, and her milk one of 1 to 400. The titer of the blood was still at this height a month and a half later. The sow was crippled about the time of parturition, and was not again able to walk. She was killed one and a half months later, and it was found that she had been suffering from a severe metritis. It was proved by guinea-pig inoculations that both her uterus and udder tissue harbored the abortion bacillus.

The results of the feeding of the same strain of swine *B. abortus* to the two series of pregnant sows above mentioned indicates that the virulence of this organism can be increased or diminished by the character of its habitat. The culture used in the first series of feedings, in which only one of five pregnant sows really became infected, had been under artificial cultivation for much more than a year, while that used in the latter series, in which two of the three sows used became infected, was the same organism recently passed through a sow.

One pregnant sow was given three feedings of cultures of the California strain of swine abortion within five days. She gave birth to six living pigs 14 days after the first feeding and 10 days after the last. *B. abortus* was recovered from the fetal membranes by guinea-pig inoculations. The guinea-pigs showed marked lesions of the kind produced by *B. abortus* isolated from swine. The agglutination titer of her blood at this time was 1 to 50. Two and one-half months later it had almost faded out.

CATTLE ABORTION GERM

We have tried over and over again to infect pregnant sows through feeding them the ordinary strains of abortion bacilli isolated from cattle, using them in cultures, in guinea-pig tissues and in fetal and placental tissue of aborting cows, but have always failed.

PATHOGENICITY FOR CATTLE

We injected two pregnant cows intravenously, one 3½ and the other 6 months before parturition, with cultures of the In-

diana swine strain. They produced normal calves, and we were not able to show by guinea-pig inoculations of placental tissue that their uteri had become infected. One of the cows failed to develop an agglutination reaction, while the blood of the other had an agglutination titer of 1 to 50 at the time of parturition, but this had entirely disappeared ten months later.

One pregnant cow received an intravenous injection of suspension of culture of the Illinois strain of swine abortion 170 days after service. She produced a living but very weak calf 220 days after service. The calf was killed before it had nursed, and its organs and the placenta were tested for the presence of *B. abortus,* by guinea-pig inoculations. Both the calf and placenta proved to be infected. The guinea-pigs showed very gross lesions characteristic of the Illinois swine abortion strain.

At the Experiment Station we have undertaken to test whether the abortion bacillus from outbreaks of abortion among swine may cause abortion in a herd of cattle that seems to have acquired herd immunity against the ordinary strains of the abortion bacillus, and if it does, whether the cattle will infect hogs. This work is not yet complete, but has already given results that indicate that a recurrence of abortion may follow the exposure of a herd of the kind defined to the swine strain.

BLOOD REACTIONS

The agglutination titer of the blood of infected sows does not usually rise as high as that of cows, and the agglutinins seem to be more tardy in making their appearance.

INFECTION OF BOARS

As before stated, Dr. Schroeder and I failed to produce a lasting infection in boars by intravenous injection. We did, however, at a later date, succeed in doing this by injecting the bacilli directly into the testicles. Boars infected in this manner were permitted to serve and to run with sows, but the sows produced normal pigs and agglutination tests of their blood were always negative.

DISCUSSION OF RESULTS

The work of several investigators has shown that the organisms responsible for abortion in sows in at least five States are closely related to, if not identical with, *B. abortus,* cul-

turally and serologically. The work of the Experiment Station of the Bureau of Animal Industry has shown that five strains of this organism, isolated from swine, obtained from investigators in four States, differ from one another in their behavior toward guinea-pigs. Yet this difference is in the degree only, and not in kind of lesions produced. All five of the strains, however, differ from all of the numerous cattle strains that we have studied, in the kind of lesions they produce in guinea-pigs. This difference is so marked and constant that we are forced to conclude that if the *B. abortus* isolated from swine is not an actual individual variety it is at least an aberrant type of the bacillus that, in addition to its pathogenicity for cattle, in which it probably originated, has acquired a true pathogenicity for swine, and with this a higher pathogenicity for small experiment animals.

The distinct types we defined are not necessarily as far apart, or as certainly true, separate varieties, as the human and bovine tubercle bacilli, but their differences must nevertheless be clearly recognized, especially as the swine strain of the abortion bacillus, as we have excellent reasons to believe, may, unlike the bovine tubercle bacillus, have the faculty of perpetuating itself through swine.

Most investigators, I believe, who have studied abortion disease of cattle, have found that strains of *B. abortus* vary as to their pathogenicity for guinea-pigs and also probably for cattle. Some strains produce lesions in a relatively small proportion of the guinea-pigs inoculated, and in these the lesions are confined to the spleen. Some produce lesions in practically every guinea-pig inoculated, affecting spleen, liver, epididymides, lymph glands and bones, and in a few instances the lungs and kidneys. Long cultivation on artificial media seems to reduce its virulence for guinea-pigs, though with some strains the reduction does not seem to be marked. We have a strain, isolated from a cow more than a dozen years ago, which has been kept alive in guinea-pigs and on culture media, and is still pathogenic for guinea-pigs. The organism seems to be able to accommodate itself to varying conditions, as is shown by the fact that nearly everyone who studies it has his own particular culture media or method of growing it. It can be made to grow luxuriantly under an atmosphere containing a normal or reduced percentage of oxygen, or in one containing a large percentage of carbon dioxid.

Our work has shown that the pathogenicity of a strain of swine *B. abortus* which has grown on artificial media for some time is increased for both swine and guinea-pigs by passage through sows. Is it not therefore likely that a strain of *B. abortus* nonpathogenic for most sows, but barely pathogenic for an unusually susceptible one, might be passed on by her as a much more virulent one? The organism seems to be a strongly mutating one, and the evidence indicates that, in addition to the strains already pathogenic for swine, there are others, among the many strains of widely varying potency which attack cattle that may become so, if opportunity offers. Outbreaks of abortion among cattle, due to aberrant or unusually virulent types of *B. abortus,* should be carefully watched.

In the guinea-pig test we seem to have a means of differentiating *B. abortus* organisms that attack swine and cattle from those that attack cattle alone, almost as certainly as we are able to differentiate the different types of tubercle bacilli from one another. It will be well worth while if investigattors who have opportunity to do so should by means of this test determine whether the organisms affecting the swine and cattle on the same farms are both of the swine type, and also to test as many strains isolated from cows as possible, to determine how common the strain pathogenic for swine is. If this is done, data that may be of great value in the study of the swine abortion problem will soon be available.

CONTROL

The work of Connaway and others and that of the Experiment Station of the Bureau of Animal Industry has proved that when *B. abortus* attacks swine it behaves much the same as when it attacks cattle. It is harbored in the udder, may reappear in the uterus at a subsequent pregnancy, may be present in the fetal membrane and discharges at an apparently normal parturition, and it is communicable through ingestion. Whether the boar is a greater factor in the spread of the disease among sows than is the bull among cows has not been proved, but the work thus far done indicates that he is not. It follows, therefore, that the same measures recommended for the control of the disease among cattle should be recommended for its control among swine. But there is one additional control measure which must now be used for both species of ani-

mals, and that is the protection against possible infection passing between them.

The food habits of swine would tend to make them more liable to pick up infection than cattle would be, but it should be easier to eradicate the disease from swine, provided communication with cattle harboring *B. abortus* for both species of animals could be cut off, because of the rapid maturity of swine and the ease with which pregnant sows can be isolated. Since pigs are probably immune, it ought to be possible to develop soon a clean herd from an infected one by keeping the young pigs intended for breeding isolated from the infected stock after weaning.

In localities in which bovine infectious abortion is present among swine the stock breeder needs to guard against abortion coming to him through two species of animals instead of one. The purchase of either infected cows or infected sows would likely mean that both species of animals on his farm would soon become infected. In bovine tuberculosis we have somewhat the same, though a more complicated problem. Tuberculosis of hogs is nearly all contracted from cattle, the hogs not being able ordinarily to pass the disease on to other hogs; but we have every reason to believe that the *B. abortus* that attacks swine is perpetuated in both swine and cattle.

VACCINATION

It is very questionable whether the use of living swine abortion bacilli as a means of vaccination against swine abortion is justifiable. The chances of carrying this type of abortion bacillus to farms where it does not now exist are too great, and besides, it is a poor policy to take liberties with an agent about which little is known as to its possibilities for evil. That some strains of swine abortion bacilli are very potent agents Dr. Schroeder and I, because of our experience with them, have become convinced.

It is to be hoped that we shall eventually have a safe and efficient method of vaccination against this disease, but that time has not yet arrived; and until it does, it will be far better to expend our efforts in trying to eradicate the disease by other means than to use an agent about which we know so little and which may possess great possibilities for evil.

I believe that it is a common practice with some producers of bovine abortion vaccine to use a number of strains of *B. abortus*

in its preparation, probably in the hope that one of the strains will be identical with or closely related to the one against which it is proposed to vaccinate. There is danger, even if a single strain of the organism is used, that it may be pathogenic for hogs. This danger is multiplied by the number of strains when mixed strains are used. Any strain of *B. abortus*, no matter what its source, intended to be used in the preparation of bovine vaccine, should be tested on guinea-pigs to make sure that it will not affect swine. Otherwise there is always the danger that the user of such vaccine, in his efforts to reduce the losses from abortion among his cattle, will introduce an organism into his herd that will attack both his hogs and his cattle. Vaccination against *B. abortus* disease is still in the experimental stage, and therefore the use of *B. abortus* vaccine can not yet be recommended.

SUMMARY

I believe that I am justified in saying that the following points have been proved by the work of several State experiment stations and that of the Experiment Station of the Bureau of Animal Industry:

1. That the organism which causes a large share of the abortion among swine is an aberrant or extra virulent type of *B. abortus;* that this organism causes certain lesions to form in guinea-pigs that are unlike those produced by the organism commonly attacking cattle, and that the *B. abortus* which attacks swine can be differentiated from that which attacks cattle only, by the use of guinea-pigs.

2. That sows become carriers through infection of their udders, and that the infection may reappear in their uteri at subsequent pregnancies, as in the case with cows, and that cattle can be infected with the swine bacillus, at least by intravenous injection.

It also seems probable, though not as yet definitely proved, that cattle and swine are equally susceptible to the swine bacillus, and that the organism originated in cattle; also that young pigs bear the same relation to infection that calves do.

That swine abortion is a grave menace to the swine industry seems clear. It apparently has not yet become general, but is evidently spreading fairly rapidly from several centers in several States. Surely intelligent efforts directed toward its control, or, better, eradication, expended now, will be richly rewarded.

THE CONTROL OF EQUINE INFECTIOUS ABORTION IN THE UNITED STATES ARMY [1]

By G. H. Koon *and* R. A. Kelser
Captains, Veterinary Corps, United States Army

AT THE 1920 MEETING of this Association in Columbus, Ohio, one of us [2] reported the occurrence of infectious abortion among Army brood mares at the remount depots located at Fort Keogh, Mont., Fort Reno, Okla., and Front Royal, Va. Subsequently regulations for the control of the disease had to be applied at Fort Robinson, Nebr., because brood mares had been shipped to that depot from Fort Keogh. In the report mentioned it was pointed out that between October, 1919, and April, 1920, a total of 83 colts were lost as a result of the infection. It was further shown that a bacterin prepared by the Army Veterinary Laboratory was giving very gratifying results in the control of the malady.

Since the time of the report at the Columbus meeting this work has been continued and further study given several phases of the problem. In the present paper it is desired to summarize briefly the results to date.

Following the favorable results obtained with the bacterin as a prophylactic agent, the administration of the same to all Army brood mares became a routine procedure. During the years 1920 and 1921 only mares in foal were treated. Beginning this year (1922) all brood mares at the remount depots, whether in foal or not, and all stallions, received the treatment.

The Bacterin Treatment

In our early work two types of bacterin were employed, the one administered to pregnant mares containing only one-half the number of organisms per cubic centimeter as that given to nonpregnant animals. Six injections, five days apart, constituted the course of treatment. Our later investigations, however, indicated that there was but very little danger of producing abortion with the full-strength bacterin. Further, as in

[1] Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

[2] Kelser, R. A. Equine infectious abortion. Jour. Amer. Vet. Med. Assoc., June, 1921.

our experience abortions ceased after the second inoculation of bacterin, it appeared that the number of injections could be safely reduced. Consequently in the latter part of 1921 we commenced to use a bacterin containing 1½ billion organisms per cubic centimeter (the two types formerly employed contained respectively 1 and 2 billion organisms per cubic centimeter) and reduced the number of injections to four, administering 1, 2, 4 and 6 cubic centimeters respectively, at five-day intervals. While we reduced the number of injections, it was decided to give two series of treatments during the period of gestation rather than one, the first series to be given in the fourth month of pregnancy and the second in the ninth month.

Thus, present regulations for the control of the disease at the remount depots provide that all brood mares, whether pregnant or not, and all stallions, shall receive two series of four doses each of infectious abortion bacterin annually. Any newly purchased brood mare or stallion received at a remount depot is given the first series of treatments without delay, preferably during the usual quarantine period. Thereafter such animals receive the treatment annually with the others. Interruption of a series by transfer to one of the other depots vitiates the treatment already started and the course is commenced anew at the new station. When an animal which has received one complete series is transferred to another station, a second series is not given until the regular time for the routine treatment of all animals.

Results Following the Bacterin Treatment

During 1920 there were foaled at the depots where infectious abortion existed a total of 195 full-term colts. There were 73 abortions shown to be due to *Bacillus abortus equi* and 26 abortions from all other causes. This constituted a loss of 24.82 per cent of the entire colt crop of these depots, due to this infection. The great percentage of these abortions occurred in the early part of the year before the bacterin treatment was started.

In 1921 the total number of colts born at full term was 228. There were but two cases which proved to be infectious abortion, and 13 abortions from other causes. Thus, but 0.82 per cent of the 1921 colt crop was lost as a result of the disease. The two cases that did occur were both at the remount depot at Front Royal, Va.

Thus far the figures for 1922 indicate that 149 full-term colts have been foaled. There has been a total of 6 abortions of non-infectious type, but not a single abortion which could be attributed to *B. abortus equi.*

These figures speak for themselves, requiring no further explanation.

As previously indicated, the bacterin injection is well borne by the animal. To date over 1,500 treatments have been given, and so far as those who have administered the same can tell, no abortions or other ill effects have resulted therefrom. In the fall of 1921 an affection among the brood mares at the Fort Robinson depot was reported as possibly due to the bacterin injection. Investigation, however, proved the ailment to be infectious anemia, and in no way associated with the bacterin treatment.

EFFECT OF BACTERIN TREATMENT ON SUBSEQUENT COMPLEMENT-FIXATION TESTS

Another point studied in connection with this work was the effect of the bacterin injection on subsequent complement-fixation tests for the diagnosis of the disease. Several thousand specimens of blood serum, taken at different periods from animals inoculated against the disease, were subjected to the serological test. The results obtained indicate that serum specimens from the vast majority of animals thus inoculated give positive reactions to the test, and that their serum will continue to give such reaction for several months.

The complement-fixation test, therefore, is of but little value when employed with vaccinated animals. However, as pointed out in the report at the Columbus meeting, the complement-fixation test, while highly valuable in establishing the presence of the infection in a particular group when a number of animals are tested, is not to be relied upon in diagnosing the disease in individual animals. This conclusion was based on the finding of aborting mares whose blood serum gave negative reactions to the serological tests while the specific organism of the disease was demonstrated in large numbers in their vaginal discharges and fetal membranes. Thus the loss of the use of the complement-fixation tests with animals which have been inoculated against infectious abortion is not a serious loss, because the greatest value of the test with animals among which the disease

has previously occurred would be in identifying individual cases.

ANTI-ABORTION SERUM

In our early work an antiserum was prepared against *B. abortus equi* with a view to employing the same, either alone, or simultaneously with the bacterin, in the event it was found that the larger doses of bacterin would produce abortion in pregnant mares. As no such trouble was experienced, the preparation of the serum was discontinued.

CONCLUSIONS

Equine infectious abortion, due to *Bacillus abortus equi,* can be effectively controlled by the use of properly prepared bacterins.

Mares, even though in advanced pregnancy, suffer no ill effects from the administration of equine infectious abortion bacterin.

The bacterin treatment renders the complement-fixation test for the diagnosis of the disease practically valueless with animals thus treated. However, this is not a serious consequence, in view of the fact that the serological tests can not be considered reliable in diagnosing the disease in individual cases.

APPROVE TUBERCULOSIS CURE

The British Red Cross, after careful investigation, has decided to purchase the vaccine treatment against tuberculosis originated by Henry Spahlinger, the Swiss biologist, and a contract for the sale has just been signed in London.

The Spahlinger laboratory will be continued and others will be established. A number of American patients, many of them advanced cases and some given up by physicians, are now under treatment in Switzerland and all are reported to be showing improvement.

The Spahlinger discovery was announced in Paris early in 1914. Little more was heard of it until after the war, but within the last year or two it has attracted considerable attention, notably on the part of the British scientists and officials. The serum can now be made, it is stated, as cheaply as the ordinary smallpox vaccine.

THE X-RAY IN CANINE PRACTICE [1]

By GEORGE P. FROST
Chicago, Illinois

TO THE SMALL-ANIMAL PRACTITIONER the X-ray is as useful, and I may say as great a necessity as it is to the physician. In the correct diagnosis of fractures, determining the position of broken bones, the types of fractures, the X-ray is well worth the trouble and expense to which its use puts the practitioner. There is a great scarcity of literature on the use of the X-ray in veterinary practice; in fact that is the chief reason for bringing up the subject for discussion. The small-animal practitioner who makes use of the X-ray in his work should come forward and give the profession the benefit of his experience.

I first became interested in the X-ray by having some personal fractures photographed, having thus become satisfied that it was practicable to use in canine work. I then canvassed several X-ray laboratories until one was found that would do the work after office hours.

Since the automobile has come into such common use injuries to dogs, consisting of fractures and luxations, are becoming very common in canine practice. This brings before us the advantages which we obtain from the use of the X-ray in those accidents, particularly in injuries of the long bones of the legs, ribs, and especially also of the pelvis and the skull.

With the aid of the picture the exact condition of the bones can be determined, and this also shows the manipulations necessary to reduce the fracture. It does away with all guesswork on the part of the operator and allows him to make a correct diagnosis and prognosis of the case.

Another angle from which to view the usefulness of the X-ray in small-animal practice is from the point of view of the owner. It educates the owner regarding the fact that you are a scientific man and not simply a dog and cat doctor, as so many kennel men claim to be.

As an advertising medium it is a success. Many owners like to talk of the ailments of their pets and are glad to spread the

[1] Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

information among their friends that their doctor had an X-ray picture taken of some part of their pet's anatomy, and that they had seen the picture of the injury. This brings us a lot of effective and desirable publicity at a small cost.

In hip-joint dislocations the X-ray shows whether luxation is simple or complicated with fracture of the head of the femur. In simple luxations the exact relationship of the affected part and adjacent structures is revealed so that we can easily decide how and where to apply traction in order to obtain desired results.

Other very common injuries that we meet with in dogs and cats are affections of the phalanges due to bites. When we receive such cases in our hospital we usually find a badly swollen paw, with several fistulous openings—conditions caused by a diseased phalanx. This is another class of cases where the X-ray is of great help. As a means of locating the character and position of foreign bodies in the stomach and intestines the X-ray is invaluable.

The average dog is very easily handled under the X-ray apparatus. To obtain a picture of the pelvis or the femur, place the patient upon its back on the plate, flex its legs, have the operator bring the machine into the proper position over the subject, talk to the animal and soothe the patient all the while, and you will find that nine times out of ten you will obtain a perfect picture.

In photographing medium-sized or small dogs, place them on their backs with their heads held in the hollow of your arm, holding the dog's left hind paw with your left hand, the right hind foot with your right hand, flexing both of the subject's legs and spreading them slightly so as to steady the patient.

As to the financial side of the business: We can not expect very substantial rewards at present; first, because the work is new with dog owners; second, a majority of our patrons can not afford to spend much money on their pets; third, the more reasonable the charge, the more frequently will we be able to interest our patrons in the benefits to be derived from the use of the X-ray. Laboratories charge from $3 to $5 for a picture.

A case that serves to illustrate the point was in a mature Boston terrier that was brought to my office by Mr. N. The history given was that he had found the dog while driving in the country; that the dog carried its right hind leg flexed and

would not bear weight on the member. Manipulation of the parts failed to reveal evidence of fracture and caused no manifestations of pain. The X-ray showed complete displacement of the head of the femur. Reduction was effected under anesthesia, a plaster cast was applied beginning at the hock, covering both hips and extending forward to the lumbar region.

DISCUSSION

CHAIRMAN FLYNN: Dr. Frost has the distinction of presenting the first paper to the veterinarians on the use of the X-ray, and he has some pictures he will exhibit.

(Dr. Frost exhibited X-ray pictures of various fractures, etc.)

CHAIRMAN FLYNN: Are there any questions you would like to ask Dr. Frost?

DR. W. H. KELLY: I had a case of a fox terrier that had a wound on the pelvis that had been there about a year and would not heal. I took the dog to the hospital and had an X-ray taken and found the dog had been spayed, and the person who did the operation used a probe to locate the uterus, and the probe was left in for a year. The X-ray showed the probe. I immediately removed the cause and had good results.

I had another case of a dog that had trouble in the left legs. I had an X-ray picture taken and it showed a complete fracture of the radius, and the other was a greenstick fracture. I am sorry I haven't the pictures with me. I recommend the X-ray for diagnostic purposes.

A magazine writer says the dog fills an empty space in a man's life. This is especially true of the hot dog.—*Hartford Times.*

The one-hundredth birthday of a Belgian veterinarian, Dr. Benoit Demol, was recently observed with a celebration in which his professional brethren and fellow townsmen honored him. He entered the Government Veterinary School at Cureghem in 1844, soon after its organization, and graduated in 1848.

The problem of bovine tuberculosis from the standpoint of human health has recently been taken up in France, following a request by the Council of Hygiene of the Department of the Aisne asking the compulsory application of the tuberculin test to cows whose milk is sold to the public and demanding that all cows with positive reaction be sent to the slaughterhouses. This proposition was not accepted by the Academy of Medicine, it being stated that the only way of warding off the transmission of tuberculosis by milk was to boil the milk.

GASTROENTERITIS IN SMALL ANIMALS[1]

By O. V. BRUMLEY

Professor of Veterinary Surgery, Ohio State University, Columbus, Ohio

THE SUBJECT of gastroenteritis is one of great importance to the practicing veterinarian because the condition presents many difficulties both from the standpoint of an accurate diagnosis and the application of proper treatment. Owing to the various kinds of food taken by small animals and the fact that such food often contains either foreign substances or preformed toxins, this condition is of very frequent occurrence.

In many cases in small animals it is wise and advisable to consider the condition from two distinct standpoints, namely, gastritis and enteritis. A large number of cases present typical symptoms of a gastritis without any involvement of the lower portion of the intestinal tract, while on the other hand the opposite is true, the intestinal tract being of primary importance. In considering this condition it is well, therefore, to keep in mind some of the more common factors producing the various degrees of inflammation and intoxication.

1. We believe that errors in diet, from the standpoint of either too large a quantity or improper quality of food, produce a large number of cases presented to us in practice for treatment. Frequently animals are presented to us for treatment with a history of loss of appetite, vomiting, etc., and upon investigation this condition is found to be due to some irregularity in feeding or in the kind of food given. It is often observed that the eating of food containing preformed toxins, such as from decomposed cadavers, produces a very serious form of inflammation of the entire digestive tract. It is very difficult to keep small animals from ingesting such substances, and during the warmer months of the year we may expect many cases of gastroenteritis from this source.

2. The condition is often brought about by various toxic substances. It is very common, I find, to have small animals poisoned, accidentally or intentionally, by one of the corrosive poisons—carbolic acid, corrosive sublimate, phosphorus, arsenic,

[1] Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

and some of the various combinations of rat poisons. These constitute a very common source of the trouble. These materials when taken by small animals naturally produce a serious form of the condition, and as a rule the entire digestive tract is affected. In some districts powdered glass is very frequently administered to produce inflammation of the intestinal tract and ultimately bring about the death of the animal. It is common to observe symptoms of poisoning in a whole flock of birds as a result of sodium chlorid or some similar substance given to them in too large a quantity with the food. Our observation has shown that in these cases an intense gastroenteritis is the usual postmortem finding. In the consideration of this condition in small animals, therefore, it is very important that these substances be taken into consideration early in making a diagnosis, so that proper treatment can be applied, and, if possible, to counteract the poison present.

3. Some cases of gastroenteritis are produced by administering foods that are too hot and when swallowed produce congestion of the membranes, which may lead to an inflammation. Many of such cases confine themselves to the anterior portion of the digestive tract.

4. In dogs and cats we find a very serious form of the disease as a result of specific infections. Many cases of distemper in these animals have their primary focus of infection in the digestive tract. A large number of the cases of distemper in dogs begin with the symptom of loss of appetite and vomiting. This indicates to us that the primary focus of infection evidently is to be found in the stomach. It produces a gastritis and may also involve the lower portion of the tract. I think most practitioners will recall many cases of this kind, which might easily be mistaken for some other type of gastroenteritis. When the case is considered suspicious of being distemper, have the animal quarantined for at least a few days in order to make an accurate diagnosis, especially to eliminate the possibility of its being this disease. In cats there is at present throughout the country a disease which has caused a great deal of trouble. It is no doubt a specific disease in which the infection begins in the digestive tract and ultimately ends in a severe form of gastroenteritis. In some districts it is becoming very difficult to raise these animals on account of this particular disease. I think it is wise, therefore, always to

consider gastroenteritis in these animals from this standpoint and keep them in quarantine in order to avoid infection of other animals. I think most of the hospitals for small animals in this country have had considerable experience with this specific infection in these animals. Other infections, no doubt, play an important part in the production of some forms of gastroenteritis. It would seem, therefore, that this etiological factor should be considered seriously when making a diagnosis in these small patients.

5. Practically all small animals have certain species of parasites. It has been our experience that some of these species of parasites, at least, produce rather serious disturbance in the digestive tract. Aside from the mechanical interference with the function of these organs, it is no doubt true that certain excretions from the parasites lead to irritation of the membranes and in some cases to general intoxication. Other species of parasites produce direct irritation to the membrane, causing, eventually, inflammation, thickening of the membranes and marked general disturbance. All cases presented that show a low-grade inflammation should always be examined for parasites. This condition is observed in all species of small animals, especially where animals are segregated. It is wise, we believe, to make a regular practice of examining them for parasites in order to avoid later trouble from the standpoint of either gastritis or enteritis or both.

6. It has been a disputed question whether or not the subjection of these animals to extremes in temperature will produce gastroenteritis. We have had quite a few cases which showed evidence of the condition, and as far as could be determined no other etiological factor was present. Perhaps reduced resistance, as a result of the exposure, plays the most important part in the production of the condition. Naturally, the reduced resistance would allow infection to take place, would disturb the normal function of the organs, and perhaps, as a result of this, gastroenteritis would be brought about.

A great many other conditions might be enumerated which no doubt have something to do with producing gastroenteritis, but we believe we have named the more important things that should be considered from a practitioner's standpoint. The reason for mentioning these different factors is that when a case is presented for examination and diagnosis we should keep

in mind the various possibilities that will produce such a condition, and, if possible, find out the specific cause. Naturally many cases will be presented to the practitioner where a diagnosis is impossible, but we should try to reduce this number to a minimum. The more accurate the diagnosis can be made, the more successful we will be in controlling the conditions that are presented and also in many cases in protecting other animals from infection, etc.

SYMPTOMS

Vomiting occurs early and is one of the most prominent symptoms, especially when the stomach is primarily involved. This symptom is of very frequent occurrence in the most severe forms of the condition. In the early stages the vomitus consists of undigested and decomposed food material covered with mucus, streaked with blood and having a disagreeable odor. The odor in these cases is characteristic of that form of gastroenteritis produced by ptomaines or decomposed food. In some cases when due to chemical causes the odor of the poison will be detected. It is often observed that specific poisons produce more or less characteristic odors when decomposed or chemically changed. As the condition continues the vomitus will consist almost entirely of mucus, sometimes mixed with bile. When only the stomach remains affected, these may be the most prominent symptoms.

Most cases of severe gastritis are usually followed by involvement of the intestinal tract. Our experience has shown that it is very difficult to distinguish between gastritis and enteritis, especially when it is produced by ptomaines, chemical poisons or specific infection. As a matter of fact the entire tract is usually affected. When the lower intestinal tract is involved the symptoms will vary with the intensity of the cause and the part affected. In the milder cases the symptoms are those of diarrhea due to functional disturbance of the bowels. In severe cases this symptom is present and the discharges are usually mixed with blood. The latter condition is observed particularly in the cases of poisons and specific infection in all the small animals. The odor of the drug may be present. Severe abdominal pain is a prominent symptom when either the stomach or the intestines are involved. The severity of this symptom will depend somewhat upon the cause and also upon the temperament of the individual animal.

In birds gastroenteritis is usually ushered in by a marked diarrhea with admixture of considerable blood with the discharge. This is especially true following such conditions as cholera or chemical poisoning.

A chronic type of inflammation of these organs is of frequent occurrence and in most cases is evidenced by loss of appetitite, or it may be variable, constipation and diarrhea alternating. The general condition of the patient is usually bad, the animal showing more or less emaciation and general cachexia. A distinction should be made between the acute and chronic form of the condition, and this is usually not difficult when the history of the case is taken into consideration and the symptoms shown by the patient. We have found quite a variation in the symptomatology of gastroenteritis, due mostly to variation in the etiological factors.

The diagnosis of acute gastroenteritis is not difficult from the standpoint of determining the presence of a severe inflammatory condition. The determination of the etiological factor producing the condition sometimes presents considerable difficulty. It is always advisable to determine, if possible, the cause of the condition so that proper treatment may be applied. We have found it to be highly desirable to examine all of the discharges to find out, if possible, the definite contents and the probable condition of the intestinal mucosa. In as much as the causative factors are so varied, we do not believe it possible to treat such cases successfully unless the diagnosis is established from this viewpoint. We will all agree, however, that there are many cases where the exact causative agent can not be found. The treatment, it seems to me, depends to quite an extent upon the cause producing gastroenteritis.

In making our examination of the patients we should also take into consideration palpation over the region of the stomach and bowels to note the degree of sensitiveness, fullness, etc. In all cases of gastritis, pain will be shown on palpation in that region. This is also true when the lower portion of the digestive tract is affected. The temperature is a good indication of the progress of the disease and forms an index as to the cause. A normal temperature should not be considered a favorable sign in all cases, because it might be just at the point of dropping to subnormal. A careful examination is advisable in all cases in order to make the diagnosis as accurate as possible.

TREATMENT

In the early stages of the condition, especially with strong patients, all food should be withheld for at least 24 to 48 hours, and then food should be given only in small quantities in an easily digested form. This should be observed for several days following the inception of the condition. In weak individuals small amounts of beef broth or milk may be allowed unless it produces vomiting. The diet of our small patients during the course of such a condition is very important on account of the deranged function of the mucous membrane. Perhaps it is advisable to eliminate all food for at least two days in most of the cases.

When only the lower portion of the digestive tract is involved the animal usually has a good appetite and considerable food will be taken, only to produce disturbance after it passes through the stomach. Therefore, such cases should be particularly watched from the standpoint of diet.

Medical treatment will depend a great deal upon the condition found upon examination. The use of an emetic is indicated in the early stages of poisonings, etc., in order to empty the stomach and prevent the toxic substances from passing on down to be absorbed and produce general intoxication as well as inflammation of the lower part of the digestive apparatus. We have found apomorphin to be the most dependable preparation, especially for dogs and cats. The dosage should be carefully considered on account of the depressing effect of a too large dose. Following this treatment I would recommend irrigation of the stomach with a 2 per cent solution of sodium bicarbonate. The object of this treatment is to remove irritating material from the stomach and also to correct extreme acidity that may be present. We have found that a practical way of introducing the solution is by the use of a small rubber tube which is inserted into the stomach with a funnel attached to the free end. The solution can be introduced in any quantity desired. By depressing the end of the tube the fluid can be syphoned out. It is advisable to allow the fluid to remain in the stomach a few minutes in order for it to mix with the contents and to dissolve the mucus. This operation should be repeated until the solution comes away clear.

Following this treatment I would recommend the use of stomachic tonics. For this purpose there is a wide choice of preparations. Iron and quinin citrate have given us good re-

sults. Tincture nux vomica or gentian may also be used for this purpose.

When the intestinal tract is also affected I would recommend the use of purgatives, preferably castor oil or magnesium sulphate in sufficient doses to remove all irritating material from the tract. After a free cathartic action, the administration of astringents and styptics is advisable. If the condition is found to be due to certain definite causes, then the treatment must be applied to counteract those things. It is rather difficult to prescribe definite treatment in all cases because of the many variations in the etiological factors. We as practitioners should particularly observe these facts in treating all cases showing evidence of gastroenteritis.

In many cases of this condition it is advisable, in dogs, to wash out the entire intestinal tract with a soda solution followed by an astringent antiseptic such as tannic acid, iron sulphate, etc. When this operation is performed it is advisable to introduce these solutions in dilute form in 1 to 1½ per cent. This operation is performed in most cases without much difficulty by the introduction of a flexible rubber tube with a funnel attached to the free end. The solution is poured into the tube and allowed to gravitate slowly into the bowels. When no obstruction is present the fluid will flow into the stomach and be ejected through the mouth. In birds a small syringe is preferable. The amount of fluid to introduce will depend upon the condition. This method of irrigation can be modified to suit conditions. We found several cases that responded readily to treatment after this operation had been performed. In very weak individuals normal salt solution may be introduced by the same method to produce general stimulation. Stimulants may also be given in dilute solution in the same manner.

In chronic cases treatment must be varied according to the condition. We have found the same general line of treatment advisable, but it must be modified according to the needs of the patient.

We must consider the various forms of gastroenteritis in our small patients as being serious and handle them with the utmost care in order to accomplish good results. I think the important thing in all such cases is an accurate diagnosis if it is possible to make it. At any rate, we do not believe rational treatment can be applied without knowing rather definitely what the conditions are.

DISCUSSION OF PAPERS IN OCTOBER JOURNAL

Some of the papers presented at the recent A. V. M. A. convention were published in last month's JOURNAL, but up to the time of going to press with that issue the official report of the discussions which followed those papers had not been received and could not be published along with the papers. Those discussions are therefore printed herewith.

DISCUSSION OF PAPER ON "THE HANDLING OF THE FISTULA OF THE WITHERS IN PRACTICE," BY B. W. CONRAD.

(*See Paper in* JOURNAL *for October*, 1922, *page* 37.)

DR. H. E. BEMIS: I am sure we are all interested in this very practical and well prepared paper. Probably most of us treat fistulas as a matter of necessity rather than choice. Nevertheless I have found a great deal of satisfaction coming from these operations when they are carefully done, as Dr. Conrad has outlined.

Regarding the cause of fistula, Dr. Conrad stated that it was immaterial, but I think it is important from one phase of the subject. I believe that oftentimes there are conditions on the premises which bring about a large number of fistulas in that particular place. We often get history of low sheds, or in Iowa, where we have timber pastures, overhanging limbs which the animals come in contact with, and we think in some cases at least we have been able to control apparent outbreaks (if I might speak of it in that way) of fistula of the withers by removing those conditions which we think are causes of this condition. I believe it is important for the practitioner to help his client out in trying to prevent this condition from occurring.

In regard to the operation, I certainly agree with the author of the article in the fact that the patient should be thoroughly prepared and completely controlled. There is no excuse for operating under any other conditions. Of course, the circumstances, as he stated, will modify the method of control to some extent.

Regarding the operation, I think that the supraspinous bursa is almost invariably the seat of the original inflammation, and in most cases you will find that a drainage opening just underneath the rhomboideus muscle will drain that area. My particular point in making the lateral incision is to get to the deep face of the rhomboideus muscle without going through the deep layer of fascia which immediately underlies it. That drains the process in most cases but does not go through the underlying fascia, which, if opened, in some cases allows migration into the deeper layers of the neck. Furthermore, I like the median line incision over the top of the withers in most cases, because then I have an easy access directly down upon the process and can explore it both from above and from the side, and I feel that I can do a more thorough operation in finding exactly the depth of the pocket and in removing all of the diseased tissue.

CHAIRMAN MULDOON: I would like to take the liberty of asking Dr. Ferguson to talk on the subject.

DR. T. H. FERGUSON: I didn't hear either one of the doctors mention draining tubes in connection with the operation. I have had some little experience with handling fistula of the withers. The first

ten years I used to play with caustics and never got very good results. The last sixteen or seventeen years I have been doing the median line operation, and my procedure is about as follows: If the horse has high withers, I don't extend the incision back over the high part of the withers. If on the other hand the horse has low withers, I extend it back farther; but if the necrotic ligament extends back involving the supraspinous ligament, or the hind part of the withers, I dissect that out subcutaneously. Where the condition is caused by some injury to the dorsal vertebra at the highest part of the fracture or an injury to the cartilage of prolongation—we get those cases, and sometimes there is an enormous swelling on each side from a fracture, and that swelling is filled with serum and has dissected its way back under the rhomboideus muscles and back between the cartilage and the withers, and there is more or less diseased tissue back there—I make the incision well forward just the same, and then dissect out as far back as I can subcutaneously, and then very often I use a drainage tube. If both sides are affected, I use the drainage tube, but instead of applying it laterally across the neck I place it in between the cartilage of prolongation and the high point of the withers, making the opening posteriorly and letting it protrude anteriorly and under the rhomboideus muscle. That drains them out quicker than any other method that I have used. As soon as you make a good, big incision, remove the necrotic ligament and keep the wound clean for a few days; give it a good start and keep it clean afterwards. By letting the air in, nature will slough out any little necrotic tissue that you happen to miss incising, and you get perfect drainage that way.

In other cases I just put the tube in laterally, from above down through and under the muscle on one side, and the same on the other. I use a half-inch rubber tube that is perforated. I have operated and not used the tube, but I find that I get better results by using a perforated tube. Those tubes are not hard to keep clean if you use a good, long tube and perforate it just through the center. In cleaning them we use one of those hair brushes similar to the water-bottle brushes.

We find in our practice that the majority of cases of fistulous withers start in the supraspinous bursa just above the second dorsal vertebra or along in that region, above and a little anterior to it. Occasionally, however, an entry of the posterior angle of the cartilage of prolongation or fracture of the vertebra will cause a large swelling and an accumulation of fluid that will keep seeking the least resistance until it is apt to form away back almost to the saddle seat, and sometimes away ahead. Those cases are rather confusing until you withdraw the fluid and make your incision and explore may be with the hand or with instruments, when you can determine the exact condition. Of course if the cartilage of prolongation has been broken or part of the scapula has been broken, it is necessary to remove the fractured part. If it is partly attached, it is often necessary to separate it with a knife or saw. In case of a diseased vertebra or a diseased shoulder blade, curetting lightly is better than curetting deeply, because nature will exfoliate that diseased part better than we can do it, and if we cut it off or curette it off too much, she is doing to exfoliate it just the same. So it is better to rely on nature doing it, as she will do a better job than we do. If you provide drainage, let the air in and remove most of the necrotic material.

I have found that the majority of cases will do well with just the one operation, and it is the most economical way for the owner. The one job takes care of it if it is well done.

DISCUSSION OF PAPER ON "DISPENSING AS AN ASSET TO THE VETERINARY PRACTITIONER," BY CHARLES W. BOWER.

(*See Paper in* JOURNAL *for October*, 1922, *page* 39.)

DR. HAMLET MOORE: I probably have a little advantage over the average veterinarian in the line of dispensing. I am a graduate in pharmacy and served ten years in the drug business. I conduct a pharmacy of my own that is equipped with all the best and latest drugs that are on the market. But there are things in Dr. Bower's paper as to which I differ with him.

People come into my office and ask for a bottle of cough sirup or worm medicine for a dog. I have yet to put up my first bottle of medicine or bottle of tablets or anything else. I simply make the statement that I will not prescribe without seeing my patient. I can see the disadvantage of that in this way: If you begin to put up medicine when a man comes in and asks you for it, you will soon be sitting in your store putting up medicine in place of making calls.

I make as much money on my medicine as anybody, because I was taught when young to get the money, though I am not on the order of the man who said his father told him, "Get it honestly if you can, but get the money." I figure on getting mine honestly. I do not believe in counter prescribing.

One day last week an Italian came to me and said, "You treated this mule for us so long ago. She has got exactly the same condition as she had when you treated her before." I said, "Well, I am not taking your diagnosis for it." He said, "Doctor, if you don't, we don't think your treatment is right." I said, "I am sorry for your diagnosis, but that is my position." The man went home and said to his father, "Dr. Moore won't sell us that medicine." His father said, "We have got to have him; telephone for him." He telephoned, and I went down there. I got $8 for the case and $2 for the medicine. Now I could have sold him that medicine for $2 and I would be $8 short. That condition prevails all the time.

As I said, I am a druggist. I have worked in the drug business from the Atlantic to the Pacific and from the Lakes to the Gulf. I have worked in only two drug stores—one in Boston and one in New Orleans—where substitution was prohibited.

When the average man or woman brings a dog to me I usually find they have given it castor oil and vermifuge, and sometimes I ask, "Why don't you give it a paint douche and finish it up?" The average man who thinks his dog has worms will give "———'s vermifuge," and there is no remedy on the market that is as disastrous as that. This vermifuge gives me more practice than all the rest of the drugs on the market put together.

You simply have got to undo what the druggist has done. I make it plain to my client that this dog is in a condition that I have got to undo what has been done before I can adopt treatment. I tell them, "I am going to do what I can for you and promise you nothing."

Dr. Bower brought out one very good point about the bottle and the label. There is not a veterinarian in the city of New Orleans besides myself who uses a bottle unless it is an embalming fluid bottle or a beer bottle. There is not a veterinarian in the city of New Orleans who doesn't write a label that he can hardly read himself. I put a typewritten label on mine. They will dispense tablets that you can't tell whether they are whitewashed or chrome yellow, and take a card and write with pencil on it: "Put one tablet in a quart of water and give him fifteen drops when you think of it," or something of that kind.

If the veterinarian will adopt the system of putting up his own medicine, the precautionary measure of Dr. Bower's is probably very fine; but I don't suppose that there are three men in this body who have such a variance of prescriptions that they can't remember. A short time ago a man who has a kennel club said, "Doc, what do you use for a dog?" I said, "It makes a lot of difference; it depends on what is the matter with the dog." He said, "Well, So-and-So said if your dog has diarrhea, use I. Q. and S.; if he has constipation, use I. Q. and S.; sore throat, I. Q. and S.; lame in the left hind leg, I. Q. and S." He went through for a long time and gave I. Q. and S. I don't believe there are more than three men in here who have such a varied line of medicals that they can't remember them, notwithstanding the fact that I think the precaution is a very good one.

My medicines pay me about $200 or $300 a month. When I first graduated I prescribed because I was in a country town, and I learned several months afterwards that the druggist had a special file for my medicines. He had numbered them and carried them in numbers, and it was only a question of time before somebody from the country would come in and say, "You remember that mule that Dr. Moore treated. Wonder what it was he gave me," and he was prescribing from my prescriptions and taking a chance whether he was right or wrong. I believe the thing to adopt is not to prescribe without seeing your patient. (Applause.)

DR. QUITMAN: Dr. Bower and Dr. Moore struck some very varying points. Dr. Moore, however, while not disparaging entirely, threw just a little bit of cold water on the keeping of prescriptions, under the contention that a veterinarian relies largely on certain pet formulæ. The point that I wish to drive home is that the veterinary profession is making giant strides toward advancement. In the last ten years, in the last fifteen years, and in the last five years it has improved intellectually and has improved physically in appearance, in business methods and all. I agree most heartily with Dr. Bower that every veterinarian, or ninety-nine out of a hundred, dispensing his own medicine should keep a prescription file just as soon as he gets money enough to lay in a stock of drugs, not only for the reasons that Dr. Bower gave—he gave you a number of good reasons as to why you should keep a prescription file—but they are the best legal proof that you can offer in case you are accused of poisoning some animal; and I don't care how innocent you are, sooner or later you are apt to be accused of poisoning somebody's animal. If the horse or dog falls over dead just as soon as you give it a dose of medicine, they are liable to accuse you of poisoning it. If you can show the court that you are careful, that you even wrote a prescription for that medicine, you have an advantage. You can take that prescription into court and it can be viewed by experts on the other side. You want to fill that prescription out, as Dr. Bower said, just as though you were going to the drug store. That will then inculcate into the minds of the court and the jury that you are careful, that you wrote that prescription first and you swear that you filled it according to that prescription.

Then Dr. Moore made allusion to the fact that so many of us use a certain pet prescription that we can remember. All true; have a prescription on file for those; give them a number. I am using today one of my pet prescriptions that I prescribed years ago. Every assistant I have soon comes to know that 208 is our one best seller. Even if I am using regular stock remedies that are put up by the gallon or five gallons, they have a number and that number goes on the prescription. That creates the idea of carefulness.

I think that the majority of points have been covered, except I want to go one point further in the appearance of the packages that are given out. I dispense every bottle with a very neat bottle

cap. The paper bottle caps are corrugated; they are very inexpensive, and you will find that two sizes are all that you need, a No. 4 for small bottles and a No. 6 for large bottles. The small ones cost 35 cents per gross and the large ones 40 cents per gross, and the added appearance that they make to a bottle is worth considerable to you. It attracts attention to your package from the other fellow's package. It makes the client feel that you are careful, that you are neat, and if you are neat, you must be careful. These paper caps are put on either with a turn or two of string, tied neatly, or with a rubber band. They also aid in retaining the cork, so that in careless handling of the bottle by the person taking it away from your pharmacy the cork will not come out.

Another point not mentioned, although alluded to by Dr. Bower, was in refills. Do not refill a dirty bottle or send it back with a dirty label. When a bottle comes to you to be refilled, that bottle should be cleansed, and if the label is soiled, as it is apt to be, put on a fresh, clean label. If the cork is dirty and filthy, put in a new cork or wash that one.

I was glad to hear Dr. Bower say that the dispensing stimulates study of materia medica. I hope he is right. The Lord knows that is one thing that the veterinary profession requires—some stimulus to the study of materia medica. And this thing of using stock prescriptions is the greatest detriment that our profession can have—I mean the practitioner's portion of the profession. While we can not avoid having perhaps half a dozen stock formulæ, in most instances where you examine a patient you should put your medicine specially suited for that case, and in that instance write a prescription and follow out the other points named in Dr. Bower's excellent paper. (Applause.)

DISCUSSION OF PAPER ON "CLINICAL OBSERVATIONS ON CATARRHAL MASTITIS IN THE COW," BY LOUIS A. KLEIN.

(*See Paper in* JOURNAL *for October*, 1922, *page* 25.)

DR. FERGUSON: I would like to ask Dr. Klein a question relative to the treatment of catarrhal mastitis. He states that he usually recommends frequent milking as a feature in treating catarrhal mastitis. I have tried both ways. In some cases of apparently contagious catarrhal mastitis where there was a decided tendency for rapid diminution in the milk supply, in addition to cutting down on the feed and administering cartharties, followed by diuretics, we have had very good success in not milking, letting them miss a milking, with the idea that frequent milking not only milked out the bacteria, but it milked out the leucocytes, and we have to depend in those cases a great deal on the leucocytes for repair or for overcoming the condition. I have handled a number of outbreaks in that way, and I wish to get Dr. Klein's opinion on that one point.

DR. KLEIN: I was not discussing the treatment of the infectious type of catarrhal mastitis. The system that I described has been applied to the treatment of the noninfectious type. I have never tried the plan followed by Dr. Ferguson. I can see reasons for believing that it might be desirable, as he says it would permit the leucocytes to remain in the affected part of the udder, and so take up the offending bacteria. Before I pass on from that point, I would say that Dr. Ferguson has a very good foundation for his treatment in the fact that it is practically the same as the Bier treatment of inflammation. I remember that treatment consisted of putting some elastic bandage around the inflamed part to retain the blood in that part. In working with these cases of noninfectious catarrhal mastitis I have always found the milk to contain an abundance of leucocytes. In fact, the excessive number of leucocytes

persists for some time after the bacteria have disappeared and after the milk has taken on a normal appearance, and after all clinical symptoms of the disease have disappeared. Because of that observation I am not certain that it is necessary to permit the retention of this infected material in the affected quarter. However, I haven't had any experience whatever, or rather very slight experience, in treating the infectious type of catarrhal mastitis. My experience has been very largely with the noninfectious type that occurs in those dairy herds which are forced for high milk production.

UNHOOKING THE HOOKWORMS IN FIJI

The carbon tetrachlorid treatment for the removal of hookworms, developed by experiments by Dr. Maurice C. Hall, is meeting with great success in the Fiji Islands, where it is being used on the natives on a large scale. "Talking of doses," writes a correspondent in Fiji to an Australian relative, "all Fiji is taking carbon tetrachlorid, the new hookworm cure, and a great improvement on the old one of chenopodium oil, which was drastic in treatment and expense. But the American Dr. Lambert, with his assistants, reckons he can do the whole of Fiji for 200 pounds sterling (less than $1,000). The dose seems to me like a tiny bubble of gas in a spoonful of water, which slightly burns (the throat). About six hours after a dose of salts is necessary, and nearly everyone is tons better in health after it."

A number of laboratory animals (rabbits) which had been inoculated with anthrax or bubonic plague in the course of the production of antiserums and vaccines were stolen from the official antiserum and vaccine institute at Naples. It is to be hoped that any resulting harm was limited to the person who committed the theft.

The French veterinary profession is agitating the question of having the national veterinary schools confer the doctor's degree in veterinary medicine or veterinary science instead of the present title of veterinarian. The faculties of the three schools (Alfort, Lyons and Toulouse) have passed a resolution urging the creation of the doctorate and proposing as the most practicable means of accomplishing this that the veterinary schools be attached to the respective universities. The matter is under consideration by the Ministry of Public Instruction.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

OBTURATOR PARALYSIS [1]

By A. R. GALBRAITH
Garfield, Washington

DURING the months of April and May, a number of brood mares in this section of the State (Whitman County) were stricken with a paralytic condition of the hind quarters shortly after foaling. In eight cases that I came in contact with, each one followed dystokia due to an abnormally large fetus, and all of them terminated in death. Five of the mares were my own cases, and I was called in for consultation on the other three. I was not present at the time of foaling of any of the mares. In each case but one the owner and his rural assistants, through the help of block and tackles, wire stretchers and strong arms, removed a dead colt. Within three or four hours, the owner, becoming alarmed at the mare not being able to arise, sent out an S. O. S. for help.

Upon arrival we find the patient down, with use of the fore quarters, but the rear end will not function properly. Some mares, being extremely nervous, especially if it is their first colt, become restless and make repeated attempts to arise, while others, apparently aware that something is wrong, will not try so frequently. After a careful examination has been made to determine whether or not a fractured pelvis or fracture of some other bone is the cause, and after hearing the history of a large fetus and of help being necessary to remove it, one is forced to the conclusion that the paralysis must be caused by pressure on some nerve.

A survey of the anatomy of the hind quarters will show that the gluteal and obturator nerves are the ones we are chiefly concerned with in this condition. The obturator nerve is derived from the ventral branches of the last three lumbar nerves. It runs backward and downward just above the external iliac

[1] Presented at the Northwestern Veterinary Medical Association meeting, Vancouver, B. C., July, 1922.

vein, then it turns inward above the obturator vein and passes through the obturator foramen in front of that vessel. This nerve supplies impulse to the external obturator, the pectineus, gracilus, and the short adductors of the leg. If only one obturator nerve is contused the animal may be able to walk, but might need assistance to arise. Then the limb would be held in extreme abduction, but weight could be borne on the affected member. When both obturators are injured the symptoms are entirely different. In the eight cases observed this year none of them were able to get up. I used slings on the first two, but had to admit that in this condition, owing to the extreme nervousness, they are contraindicated, as the majority of patients will fight them. Neither of the two that I used them on were able to stand on their feet, due probably to the moving of one of the feet which caused the legs to slip apart and the animal would fall upon the pubis.

Treatment.—Strychnin in my opinion should be avoided in this condition, as it will tend to cause too much excitement. I have noticed that better results are obtained by using digitalis. Chloral hydrate can also be given if the patient becomes restless. The placenta is retained in most of these cases. Of course it should be removed immediately. Then catheterize. This should be done at least three times a day, as well as to remove from the rectum any accumulated feces there. There seems to be a semiparalysis of the muscles of the rectum and the bladder, as none of the cases observed could defecate or urinate. The animal should also be turned over very often, in fact, after the second day as often as every thirty minutes, as it will tend to decrease the restlessness.

Prognosis.—Unfavorable.

Conclusions.—I have laid more stress on the obturator nerve than on the gluteal because in the latter (according to Williams) the paralysis will disappear in from two or three days to three weeks. When the gluteal is affected the paralysis is generally unilateral, while in obturator paralysis due to the abnormally large fetus in all the cases I have observed the paralysis was bilateral. The obturator nerve can be injured in two places from the fetus—where the nerve passes over the lumbosacral articulation and where it rounds the margin of the obturator foramen.

If the patient should happen to be one of the kind that is

not very nervous when afflicted, then slings might be applied and the hind feet tied together to prevent abduction. But personally I am opposed to the use of slings in this condition. The main issue is stimulation without increasing the nervousness, frequent catheterization and if necessary an anodyne like chloral hydrate or cannabis indica.

AN OUTBREAK OF RABIES

By J. T. QUARLL
Avondale, Pa.

THE OUTBREAK of rabies here reported, in my opinion, is of interest because it shows the necessity for close inquiry as to when animals were actually exposed to infection, as well as the value of the single dose rabies vaccine.

About March 5, 1922, a stray dog, showing clinical symptoms of rabies, passed through Avondale, Pa., and fought with several dogs, one of which was owned by Mr. Howard Brosius. This dog was severely bitten. The stray dog disappeared and all trace of him was lost.

On April 8, the Howard Brosius dog developed rabies, fought with several other dogs in the community and also attacked a cow. The cow was severely bitten on the head.

The cow and all of the dogs that we knew had been exposed to infection from the Howard Brosius dog were given canine rabies vaccine, single dose treatment, from two to four days after this exposure.

Of the total number of animals vaccinated, three dogs developed rabies in from 4 to 6 days after having been vaccinated. The balance of the animals, including the cow, failed to develop rabies.

It is impossible to cause rabies by injecting the particular product used, under the skin of an animal. In view of this fact, and in view of the fact that these animals developed rabies in from 4 to 6 days after having been injected, the vaccine could not have caused the disease, and it, therefore, was freed from blame.

However, I wanted to know more about these cases and upon investigation it was found that the animals that developed rabies, subsequent to vaccination, were animals owned in the

vicinity of the Howard Brosius premises and were animals that had been exposed to the original stray dog that passed through Avondale about March 5. At least 5 weeks had elapsed between date of their first exposure and date of vaccination, and in about 6 weeks, after being exposed to the stray dog, these dogs developed rabies.

I am strongly in favor of using the single dose rabies vaccine as a prophylactic, and look forward to the day when it will be required that all dogs be licensed and immunized against rabies. However, my experiences show that the single dose treatment is not only a prophylactic but will also prevent the development of rabies in animals that have actually been exposed to this disease, if the treatment is given within a reasonable time after exposure.

A single injection is probably all that is necessary for small animals and two treatments (10 c.c.) for horses and cattle. However, I have no hesitancy in using two and three injections on the small animals and two to five or more on the larger animals at one to three day intervals. I have had no bad results.

One of the vaccinated dogs, that has come through without developing rabies, was severely bitten about the head, neck and throat, besides other smaller wounds on the body. One large ugly lacerated wound in the vicinity of the angle of the inferior maxilla, opened into the buccal cavity and was very hard to heal.

The wounds received treatment in about 12 to 18 hours, but the dog was not vaccinated until the third day after exposure. This dog received three single dose treatments. Two full doses (10 c.c.) were given as the first treatment and the other single (5 c.c. each) dose treatments were given at three day intervals, a total of 20 c.c. being given.

The cow referred to in this report is worthy of special mention because three doses of the single dose treatment held this animal, in spite of the fact that she was badly bitten about the head. First treatment was 15 c.c. and second and third treatments 10 c.c. each. The treatments were given at two and three day intervals, a total of 35 c.c. being given.

In very severely bitten cases I have no hesitancy in using two or more doses for dogs and three or more doses for cows and other larger animals for the first treatment.

ANOTHER CASE OF BLACKLEG IN SHEEP

By HADLEIGH MARSH
Montana Livestock Sanitary Board, Helena, Montana

TWO YEARS AGO this laboratory reported the occurrence of blackleg in a bunch of sheep. Our diagnosis was confirmed by Miss Heller of the University of California, who recovered a typical strain of the bacillus of blackleg from material from one of these sheep. Recently another specimen was sent to this laboratory by Dr. C. H. Stevens of Stevensville, Montana, from the muscle of the thigh of a sheep, from which we recovered and isolated in pure culture the bacillus of blackleg.

We do not have a complete history of this case. The sheep was sheared June 12, was sick June 13, and was unable to rise on June 15. The left hind leg was swollen from the hoof to the hip. Three or four other sheep died out of the same bunch, but we do not have complete information as to the extent of the loss.

The muscle specimen was dark red and spongy, having an appearance exactly similar to the characteristic dark, spongy muscle found in cases of blackleg in cattle. A portion of the affected muscle was ground in a mortar with salt solution, and the suspension was injected into the thigh of a guinea-pig. The guinea-pig died in 36 to 40 hours. Postmortem showed swelling of the inoculated leg and the flank, the muscle being hemorrhagic and emphysematous. There was only a small amount of subcutaneous gas. The peritoneum was slightly congested. The internal organs were apparently normal. Smears from the muscle showed a spore-forming bacillus corresponding morphologically to *Bacillus chauveaui*. Smears from the surface of the liver showed a number of rods, some of them in pairs, but no chains or filaments.

Cultures from the heart blood in liver-brain medium developed a pure culture of a large Gram-positive bacillus showing spore formation and many irregularly staining "orgont" forms. The cultures were nonproteolytic, there being no blackening of the brain medium nor of lead acetate test paper. Shake cultures in 1 per cent dextrose-agar developed minute pin-point colonies, with no radiations. A second guinea-pig was inoculated with a liver-brain culture and died in 36 to 40 hours. Smears from the surface of the liver showed numerous bacillary forms, many

in pairs, and a few fours, but no long chains or filaments.

The reactions of this organism in artificial cultures and in the guinea-pig establish the diagnosis of blackleg.

When the specimen was received at the laboratory I expected to find *Vibrion septique* and make a diagnosis of malignant edema due to wound infection after shearing. The finding of blackleg instead of malignant edema in this case lends support to the idea that the blackleg organism is not necessarily specifically connected with outbreaks of blackleg as generally recognized, but that this organism may be the cause of sporadic and occasional cases of blackleg in cattle and sheep and possibly other animals. In other words, when an animal receives a wound of a nature favorable to the development of anaerobic bacteria, it is more or less a matter of chance whether the bacillus of blackleg, *Vibrion septique* or some other anaerobe will be the invader.

NEW VETERINARY HOSPITAL

Early in October ground was broken for the new veterinary hospital of the Kansas State Agricultural College, at Manhattan, Kansas.

The new building will stand directly opposite the old Armory, which was the first building erected on the campus of the college. Thus the oldest and newest structures will face one another.

The hospital building will be constructed at a cost of $100,000.

Dr. B. L. Lake has given up his private practice at Oregon, Ill., to accept the position of County Veterinarian for Whiteside County, Ill., to devote his entire time to tuberculosis eradication. His previous experience of nine years in general practice at Tentopolis, Ill., and of one and a half years as veterinarian and Assistant Manager at the Sinnissippi Farms, should be of great advantage in carrying on the duties of his new position.

Dr. Wm. Moore, State Veterinarian, and Dr. C. C. Watts, Assistant State Veterinarian, of North Carolina, have completed a law course and were granted a license to practice law by the Supreme Court of North Carolina, on an examination held August 21, 1922.

ABSTRACTS

THE DURATION OF THE INFECTIOUS PERIOD IN APHTHOUS FEVER (FOOT-AND-MOUTH DISEASE). Charles Lebailly. Comp. Rend. Acad. Sci., vol. 174 (1922), no. 24, p. 1580.

Classical treatises and current opinion are in accord as to aphthous fever being infectious for several weeks. The sanitary police regulations impose a quarantine of at least 15 days following the cure (disposal) of the last case of aphthous fever in an outbreak. Then, it is important for the struggle against the epizootic, to determine exactly, if possible, the extent of the period during which animals attacked are capable of transmitting the disease. This idea presents a leading interest for experiment.

The experiments, the results of which I report, were made in the stable, principally on bovines of Normandy breeding, young or old, excluding females in the period of lactation, on which, for material reasons, it has not yet been possible for me to experiment. The virus that I used came from an outbreak in the vicinity of Caen, where it was procured in the course of an epizootic in December, 1920. I kept it alive by passing through susceptible animals. The form of disease thus induced appeared from the third to the seventh day.

If, at the first indication of a rise in temperature till the rupture of vesicles took place, I brought a susceptible bovine in contact with the sick one, the former infallibly contracted the disease. Its temperature increased at the end of 48 to 72 hours—it was a classic infection.

If, on the other hand, I allowed 4 days to pass after the appearance of the first vesicle, which in general follows closely after the initial sign of fever and manifests itself exteriorly by the appearance of slobbers, and then brought into the stable a susceptible animal, it did not become infected. There was complete contact between the two animals, both were hitched to the same ring for 6 hours, they ate from the same rack and manger, they drank from the same receptacle, and shared the same litter, and after the 6 hours of contact the susceptible animal occupied the place of the sick one. No disinfectants of any sort were used. My stables are like those on farms where

the disease has a free course, the animals subjected to the infection had all facilities for picking the germs (virus) of aphthous fever from the walls, the beams, and the remains of litter from the preceding days.

During this period of contact the sick animal presented a lamentable aspect; the ulcerated (inflamed?) vesicles were partly covered with a grayish deposit, shreds of epidermis (mucous membrane) were still being detached, a mossy froth came from the mouth, and there was heard at intervals the characteristic sucking sound.

It is the current opinion that at this stage this animal is highly infectious, that it must be disinfected as well as the objects it has soiled. However, for 8 months in the localities where I experimented I suppressed completely the use of disinfectants; my new animals were brought into the stables with the sick ones on the fourth day following the appearance of vesicles. I have never under these conditions observed a case of infection. It goes without saying that my new animals were quite susceptible, a fact proven 15 days or a month later by the inoculation of the virus or by direct contact during the virulent period of the disease, when they were always infected.

Thus it appears that in the evolution of aphthous fever we must distinguish two periods. The first period obscure, impossible to diagnose through observation, is fully more dangerous since it can not be recognized except by thermic rise of temperature. As soon as there is noted a thermic rise, if only of a few tenths degree, the animal disseminates the infection wherever it goes and transmits the disease, unsuspected, to others which spread it in the same way.

On the other hand, the second period, which attracts the attention of even unqualified observers, does not, in the least, merit the terror which it inspires. The disease at that stage is most painful to the animals, but when they have slobbered for four days they are incapable of transmitting aphthous fever.

The conclusion reached through my experiments is that the disease is propagated in the animals only during the period of invasion and incubation, which time is very short. These observations explain the weakness of sanitary measures applied when epizootics have reached a certain development. The most radical measures, such as slaughter, attain nothing more than supervision and sequestration of primary centers.

In a period of epizootic the animals that have slobbered for four days are less suspicious than those of healthy appearance, as they are then inoffensive since the virus of aphtous fever has died within them. The healthy appearing animals are the ones that should be quarantined before being introduced into an indemnified herd. T. P. W.

THE VETERINARIAN AND THE LIVESTOCK SERVICES IN THE UNITED STATES. C. Lopez y Lopez. Revista de Higiene y Sanidad Pecuarias, Madrid, vol. XII (1922), no. 5, pp. 220-250.

In this article, the nature of which is indicated by the subtitle "Impressions of a Traveler," the author describes his visits to the laboratories of H. K. Mulford Co., Lederle Antitoxin Laboratories, the Veterinary School of the University of Pennsylvania and the U. S. Bureau of Animal Industry and discusses in a general way the differences between conditions here and conditions in Spain.

Full information is given regarding courses of instruction, etc., at the University of Pennsylvania Veterinary School and there is also a general discussion of veterinary education in the United States.

The organization and work of the U. S. Bureau of Animal Industry are taken up in some little detail, with a brief description of the work of each division. The Bureau is, in the author's opinion, the greatest organization of its kind in the world, and worthy of imitation by other countries.

THE LICKING HABIT IN CATTLE AND ITS CAUSES. N. Zuntz. Abst. in Biedermann's Zentralblatt, vol. 1 (1921), part 1, pp. 33-34.

The analogy between the symptoms of licking disease and those induced by depriving young growing animals of certain constituents of protein, such as tyrosin, is, according to the author, so striking, that we are compelled to suppose that the habit of excessive licking in cattle is due to the absence of one or more of the substances necessary for the development of the body. Further, the grazing experiments made by the author, the success of applying a dressing of sodium nitrate to the pastures, and the fact that the second cutting suited the ani-

mals better than the first cutting of hay, all suggested that the trouble was due to a deficiency of protein.

The richer the forage in protein, the easier becomes the elimination of the constitutents which are not used in metabolism. Further, in many cases, the real remedy for the licking disease may consist, on the one hand, of increasing the absolute amount of protein, and on the other of giving protein of a different composition by altering the constituents of the forage, or the fertilizer, or using forage of a different quality. The drying of the forage may also have some effect, seeing that under natural conditions certain components are washed out by the rain, and that the action of the sun produces chemical changes affecting some important substances present in fresh grass.

The author, after a consideration of all the data referring to the licking disease, and the conclusions that may be drawn from them, recommends the following prophylactic measures:

(1) Care should be taken that sodium should not be lacking in the forage. The rest of the mineral constituents should form a basic mixture containing 600 to 750 mgm. of alkali equivalents.

(2) The protein content of the ration ought to be increased by the addition of concentrates rich in protein (linseed cake) suitable for ruminants.

(3) Hay must be made of the youngest grass possible; this has recently been advised by Neubauer as the best means of remedying the lack of protein in forage intended for growing stock.

(4) In conclusion, the author lays great stress on the necessity of further experiment to determine whether the good effect of sodium nitrate observed by him is to be attributed to the sodium, or the nitrogen.—(*From Internat. Rev. of Sci. and Prac. of Agric., Nov.*, 1921, *p.* 1436.)

THE KEEPING QUALITIES OF DILUTED TUBERCULIN. A. Eloire. Rec. Méd. Vét., vol. 93, no. 7, April 15, 1922, p. 200.

Ordinary tuberculin intended for subcutaneous injection, kept for seven years (1914 to 1921), was found to have retained apparently unimpaired its diagnostic properties when used for the intradermic and palpebral tests. The tuberculin was contained in small bottles with rubber stoppers tied with cord, and the bottles were wrapped in colored paper, so that the product was protected from air and light. It contained phenolized water as a diluent.

A COMPARATIVE STUDY OF BOVINE ABORTION AND MALTA FEVER, FROM THE BACTERIOLOGICAL POINT OF VIEW. Z. Khaled. Jour. Hygiene, vol. 20 (1921), no. 4, pp. 319-329. Abst. in Trop. Vet. Bull., Aug. 31, 1922, p. 78.

In the investigations detailed in this paper 13 strains of *B. melitensis,* 10 of *B. abortus,* and 3 of *B. paramelitensis* have been examined. They are said to be representative of strains isolated in America, on the Continent, and in this country.

The author supports the view put forward by Meyer and Feusier that a special genus—"*Brucella*"—should be made for these three organisms.

A brief account of the morphology and cultural characters of the organisms is given.

In a section devoted to methods of infection the author states, in connection with *B. abortus,* that after abortion takes place "The animal recovers and then either remains sterile or aborts soon after service, generally after two months. * * * The males apparently act as carriers. The causal organism can be isolated from the spleen, liver, testes, seminal vesicles and uterine discharges, as well as from the milk; the fetal membranes, stomach, amniotic fluid and cotyledons as a rule give pure cultures. Isolation and disinfection are very effective measures."

Although 26 strains of the three organisms are mentioned in the early part of the paper, the author later states that 30 were used.

In the agglutination tests, details of the results with only 9 of these are given. Of these, 3 were *B. melitensis,* 2 *B. paramelitensis,* and 4 *B. abortus.*

Antisera, prepared from rabbits, were used against all of these. A serum was considered satisfactory only when it caused agglutination with the homologous organism in a dilution of 1 in 6,400.

Anti-*melitensis* serum agglutinated *B. melitensis* and *B. abortus* to about the same extent, and was practically inactive with *B. paramelitensis.*

Anti-*abortus* serum agglutinated all the nine strains to about the same extent, while anti-*paramelitensis* serum was active almost exclusively with its homologous organism, no agglutination taking place with any of the other strains in dilutions above 1 in 200.

In the absorption tests the results obtained with only five or six of the strains used are given, and only *B. melitensis* and *B. abortus* were used.

B. melitensis removed from anti-*melitensis* serum all agglutinins for *B. melitensis* and *B. abortus.*

B. abortus removed from anti-*melitensis* serum all agglutinins for the same organisms.

B. abortus removed from anti-*abortus* serum all agglutinins for *B. abortus* and *B. melitensis.*

B. melitensis removed from anti-*abortus* serum all agglutinins for *B. melitensis,* but not those of *B. abortus;* this organism was still agglutinated in dilutions of 1 in 800 after the absorption.

In a single experiment, inoculation of a monkey with *B. abortus* was found to confer some degree of immunity against a subsequent inoculation with *B. melitensis;* the control monkey showed a febrile reaction to the test inoculation, which lasted a month, and continued to lose weight.

In regard to the pathogenicity for man, the author states that he has seen cases in Egypt which were typical undulant fever, confirmed by laboratory diagnosis, in persons who have never ingested goat's milk. He suggests that *B. abortus* bears to *B. melitensis* a relationship similar to that of cowpox to smallpox.

THE RELATIONSHIP BETWEEN B. MELITENSIS AND B. ABORTUS, BANG. J. Skaric. Zeitschr. f. Hygiene u. Infektionskrankh., vol. 95 (1922), no. 3, pp. 358-364. Abst. in Trop. Vet. Bull., Aug. 31, 1922, p. 79.

The author has carried out a number of tests with different strains of abortion bacilli and Malta fever organisms and with immune sera prepared by means of these. The results are parallel with those obtained by other investigators.

He suggests that agglutination shown by the serum of patients with Malta fever bacili may possibly be due to agglutinins elaborated as a result of the ingestion of milk containing abortion bacilli.

THE TREATMENT OF MALTA FEVER AND CONTAGIOUS ABORTION OF CATTLE WITH COLLARGOL AND SIMILAR PREPARATIONS. H. Ziemann. Deut. Med. Wochenschr., vol. 47 (1921), no. 18, p. 500. Abst. in Trop. Vet. Bull., Aug. 31, 1922, p. 79.

The author states in this brief note, that he has been able to effect a cure in cases of Malta fever by intravenous injections of a two per cent solution of collargol. The dose was from 2 to 4 cc.

In one case a single injection sufficed, but in others a second injection was given. In the absence of further cases upon which to try the method he has turned his attention to contagious abortion because of the similarity of the causal organisms. It is not clear that he has actually carried out any experiments in this connection. No results are given.

KEEPING MILK BY THE ADDITION OF POTASSIUM DICHROMATE WITHOUT INJURING TUBERCLE BACILLI PRESENT IN THE SAMPLE. Krautstrunk and Forst. Zietschr f. Fleischu, Milchhygiene, vol. 32 (1922), no. 10, p. 121.

The addition of 1 to 100 potassium dichromate to milk does not destroy the virulence of tubercle bacilli after 12 days contact. Fifty per cent of the guinea-pigs injected with this material die with symptoms of poisoning after a few days. Guinea-pigs inoculated with milk containing tubercle bacilli preserved for 5 and 7 days with potassium dichromate in the proportion of 1 to 500 developed extensive tuberculosis. An addition of potassium dichromate in the proportion of 1 to 500 prevented the coagulation of milk at room temperature for a period of about 3 weeks. The development of bacteria in milk was prevented to a notable degree by the addition of potassium dichromate in the proportion of 1 to 500. Milk samples intended for examination for tubercle bacilli are best preserved with potassium dichromate in the proportion of 1 to 500.

"Hum," murmured the doctor absently, as he cut into his restaurant steak. "Hum, patient very sentile, with extreme hardening of the tissues."—*New York Sun.*

REVIEWS

POULTRY DISEASES. B. F. Kaupp, B. S., M. S., D. V. M., Pathologist and Poultry Investigator, Animal Industry Division, North Carolina Agricultural College. Published by Alexander Eger, Chicago, Ill., 1922. Price $2.75.

The publication of the third edition of "Poultry Diseases," by Professor B. F. Kaupp, has just been announced. This edition contains 342 pages and 134 illustrations, and is divided into twenty chapters, as follows: Anatomy, Sanitation, External Parasites, Internal Parasites, Diseases of the Digestive Tract of Fowls, Diseases Due to Bacteria, Constitutional Diseases, Diseases of the Respiratory Passages, Diseases of the Liver, Diseases of the Ovary and the Oviduct, General Diseases, Tumors, Diseases of the Brain and Nerves of the Fowl, Bacteria of the Intestinal Tract of the Fowl, Composition of the Egg, Malformation, Fractures-Wounds-Anaesthesia, Castration or Caponizing, Foods Poisonous to Fowls, and Poultry Remedies.

The range of Dr. Kaupp's work is apparent from the chapter titles and that it is popular among poultrymen and veterinarians is evident from the fact that already the third edition has appeared upon the market. The new edition appears in attractive form; the illustrations are clear, the paper and binding are of good quality, and, most important of all, it shows great care in the selection, preparation and arrangement of the subject matter. The diseases and care of poultry are subjects that are steadily increasing in importance. Dr. Kaupp's work on poultry diseases is found in the library of many of our veterinary practitioners and the new up-to-date edition no doubt will get a welcome reception. U. G. H.

DIAGNOSIS AND TREATMENT OF TUBERCULOSIS. A. Wolff-Eisner. Leipzig, 1921; p. 188; published by Tauchniz. With 16 plates and 15 figures. (Translated from Bulletin de l'Institut Pasteur, vol. 20, p. 567.)

This first part of the work, which is to comprise three parts in all, is devoted to the specific diagnosis of tuberculosis, especially to the tuberculin reactions.

The first of five chapters concerns the technic and different methods of application of tuberculin (cuti-reaction, ophthalmo-reaction, etc.) (pp. 1-41).

The value of the tuberculin reaction in different affections (internal pathology, dermatology, gynecology, pediatry, ophthalmology, laryngology, etc.) is the subject of the second chapter (pp. 42-128).

The third chapter (pp. 129-193) gives a brief résumé of the processes susceptible of facilitating diagnosis and which the author terms auxiliaries, such as agglutination after Courmont-Arloing, the fixation reaction, activation by means of cobra venom after Calmette, the opsonins and dialysis after Abderhalden.

An entire chapter (pp. 144-163) is given to a treatise on subcutaneous injections of tuberculin: technic, indications and counterindications, diagnostic value and complications.

Finally, the fifth and last chapter (pp. 164-182) examines the question of diagnosis from the social, economic and political points of view; the part to be taken by the army, insurance companies and rural economy (bovine tuberculosis).

The fame of the author makes it unnecessary for us to emphasize the rigorous scientific care which characterizes the work. What gives it a special value is that the author is not only a laboratory man of recognized competency, but is also a well-informed physician, never having lost contact with the clinic.

WISCONSIN HAS ONE-FOURTH OF COW-TESTING ASSOCIATIONS

The 115 cow-testing associations in Wisconsin equal almost one-fourth of all the associations of the country. Twelve of these associations have been organized since December 1, 1921, and the membership in the State now numbers about 3,300 farmers owning 55,000 cows.

The aims of the associations have been to weed out unprofitable cows and to feed the animals balanced rations for maximum milk production. Records of the associations show the value of high-grade cows and purebred sires. Last year 335 purebred bulls were purchased by the associations and 83 scrub bulls replaced by purebreds in 59 associations.

ARMY VETERINARY SERVICE

A BRITISH ARMY VETERINARIAN ON AMERICAN HORSES

SOME interesting observations on his experiences in the purchase of horses and mules in the United States for the British Army during the war are contained in a paper presented by Dr. C. W. Cartwright before the North Wales Veterinary Association and published in *The Veterinary Record.*

"The purchasing points," he says, "were situated chiefly in the big cities of the horse-raising districts of the Middle West, of Illinois, Missouri, Iowa, Kansas, Minnesota, and even as far west as Ogden, in Utah, while mules were obtained principally from St. Louis, the Southern States, and as far south as San Antonio, in South Texas."

The procedure of examining animals before purchase was as follows: "Paces shown, mouth and eyes examined, forelegs handled, trotted, backed, turned, etc., and, if satisfactory, passed down to have temperature taken and be ridden for wind. Seldom could the hind legs be handled without special precautions; to do so was to court disaster. In the wind test the horse was ridden by expert cowboys, who, by the way, well earned their high pay. I never saw one unseated unless the horse fell."

Artillery and heavy horses of the Percheron class, he says, were good and plentiful. "Belgians, Clydesdales and Suffolks were also met with, while Shires (generally of very indifferent quality) were seldom seen. Shires are not popular in America. Riding horses were indifferent, lacking in that great essential, 'good shoulders.' Cow ponies of mustang type were hardy and capable of good service, while the Standardbred saddle horse of Kentucky, so prized in America, was tried but found lacking in stamina. Pacing horses were not purchased."

The rejections for veterinary reasons were many, and included age, respiratory diseases, defective vision of all kinds, periodic ophthalmia in all its stages, even to total blindness; usual diseases of bone and cartilage and wire cuts of all kinds. Laminitis and dropped soles were very common in horses, but, curiously, he did not meet with any in the mule. Shivering and stringhalt were, however, common in mules. Of all the diseases encount-

ered in animals after purchase, catarrhal or shipping fever with its resultant complications formed the greatest percentage of cases. The mallein test was applied as daily routine.

"Towards the end of the day," continues Dr. Cartwright, "when the contractor's horses had all been shown, smaller fry in the dealing world would, by arrangement, be allowed to present animals for inspection. As a rule they belonged to the Jewish fraternity, could 'guess' more than the truth, and were past masters in the art of faking. To mention a few conditions —bishoping, vicious horses doped for the day, inflation of atrophied or sweenied shoulders, also hocks to mask a small spavin, curbs singed and flattened, sand-cracks neatly filled, cocain occasionally used, roarers with nostrils plugged high up with one or more small rubber balls or lemons tied to a string —if opportunity presented they would be removed."

In conclusion Dr. Cartwright says of American horses and mules, "I am sure we are agreed that, though our debt to the British war horse and mule is great, our debt to them is greater."

A DEFINITION OF BOVINE VIRUS

In his series of favorite stories Irvin Cobb relates the following:

In a rural district in Indiana is a general practitioner of medicine, who covers up a wide and comprehensive range of ignorance under an impressive front. Among the natives he passes for a veritable fount of wisdom.

One evening he walked into the country store, and the storekeeper, addressing the congregated loafers about the store, said:

"Now we can find out about it." He turned to the newcomer.

"Say, Doc," he said, "there's a question come up that we want you to settle. I been readin' in the paper here about this here new bovine virus that them foreign doctors is usin' now. Just what is bovine virus, anyhow?"

The oracle scarcely hesitated.

"Bovine virus," he said, in his most oratorical manner, "derives its name from the man that discovered it—the eminent French scientist, Dr. George W. Bovine."

"There, now," said the storekeeper, facing the audience, "I told you the Doc would know if anybody did."

ASSOCIATION NEWS

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of Fifty-ninth Annual Meeting, St. Louis, Mo., August 28 to September 1, 1922

(*Continued from the October* JOURNAL.)

TUESDAY AFTERNOON, AUGUST 29, 1922

The second general session convened at 1:35 p. m., President Kinsley presiding.

REPORT OF COMMITTEE ON HISTORY

PRESIDENT KINSLEY: The first thing that we will have will be the report of the Committee on History. Dr. Mayo, the Secretary, has the report of Dr. Adams and will read it.

(Secretary Mayo read the report, as follows:)

Since the Denver meeting the chairman of this committee has continued to gather facts relative to the history of our profession in these United States, and respectfully submits the following as accomplished and indicative of the status of your committee's work:

1. Veterinary schools. The important facts relating to the origin, growth and influence of the several private, State or Provincial schools from which veterinarians have been graduated have been ascertained thus far solely from printed catalogs and other official publications. These data must be considerably augmented and given a personal touch through correspondence with present or past officers of these schools. Your committee has felt that this part of its work was less urgent and could safely be considered last, because such histories are largely matters of record.

2. Biographic sketches of the makers of veterinary history—those pioneers in American comparative medicine who constituted all there was of our profession between thirty and fifty years ago—should give the chief interest and value to the history. Much material is on hand, but much more is needed. May we not count upon your hearty cooperation when we ask you for such information?

3. State veterinary associations and the legal enactments of the several States by which the profession has been given recognition, protection and assistance have been a matter of investigation and record. It is expected that during the coming year this will be completed, sifted and properly embodied in our report, at least so far as the older States are concerned.

4. History of the United States Bureau of Animal Industry. During the past year Dr. U. G. Houck, a former member of this committee, and for some years past an official of the B. A. I., has continued the preparation of an accurate and fairly complete historical sketch of the B. A. I. With the consent of the Chief of the Bureau, Dr. Houck has collaborated with the chiefs of the several divisions, and announces, August 14, 1922, that the sketch is about completed. It will consist of at least 560 pages of manuscript and will make about 225 pages of printed matter.

5. History of the A. V. M. A. This will be given very briefly, because it is now largely a matter of printed record, in its minutes and proceedings.

In conclusion, your committee believes the completed history of the veterinary profession in the United States and Canada will be ready to submit to the A. V. M. A. at its next annual convention and craves your patience till then. JOHN W. ADAMS, *Chairman.*

On motion of Dr. O. Faust of Poughkeepsie, N. Y., it was voted that the report be received and the committee continued.

REPORT OF EXECUTIVE BOARD

PRESIDENT KINSLEY: The Secretary has a partial report from the Executive Board, particularly referring to the election of new members.

SECRETARY MAYO: The following applications for membership have been favorably recommended by the Executive Board:

Mosley, Thomas, Duncan, Okla.
Farquharson, James, Fort Collins, Colo.
Olson, Edgar L., Prescott, Ariz.
McKitterick, James A., Greenwood, Mo.
Shake, Frank Curtis, Hutsonville, Ill.
Wallace, William A., Ashland, Ky.
Strader, H. N., New Hampton, Iowa.
Williams, Edgar A., Aurora, Nebr.
Gartell, J. V., Lincoln, Nebr.
Wesner, Marnie E., Ohio, Ill.
Rose, G. A., Toronto, Canada.
Head, William M., Bradford, Ill.
Cook, O. A., Arrowsmith, Ill.
Davis, D. E., Manhattan, Kans.
Sartorius, George Raymond, Athens, Ill.
Randall, Raymond, Washington, D. C.
Grove, E. E., Newell, Iowa.
Pease, James F., St. Louis, Mo.
Lipe, V. R., Raymond, Ill.
Villeneuve, J. H., Montreal, Quebec.
Rhodes, Howard C., St. Albans, Vt.
Thompson, Henry R., Kansas City, Mo.
Long, R. S., Upham, N. D.
Thompson, William A., Elmvale, Ontario.
Beckmay, C. H., Humboldt, Iowa.
Henderson, C. J., Newman Grove, Nebr.
Gilliatt, Floyd, Decker, Ind.
Leider, L. S., Howard, S. D.
Barber, John W., Exeter, Nebr.
Tobias, David D., Lincoln, Nebr.
Leffler, David, Bronx, N. Y.
Fletcher, Arthur Taylor, Virden, Ill.

It is recommended that those names I have read be elected to membership.

(On motion of Dr. Hoskins, the recommendation of the Executive Board was approved.)

SECRETARY MAYO: The Executive Board recommend that the By-Laws be suspended and the following be elected to membership:

Shikles, J. R., Dearborn, Mo.
Winegardner, C. C., Goshen, Ind.
Cunard, T. J., Ninety-Six, S. C.

None of the schools from which these persons were graduated were recognized by the Association. Graduates of the Western Veterinary College who have made good in practice after they have been out a number of years have been accepted under suspension of the By-Laws. The University of South Carolina granted a degree in veterinary medicine to Dr. Cunard. He was the only man who ever received the degree of veterinary medicine from that institution. He is vice-president of the State Association, president of the Southern Cattle Growers' Association, and an outstanding man in that country, and he is recommended by Dr. Nyles who was professor of Veterinary Science of that school at that time when he took his degree in veterinary medicine.

(On motion of Dr. Hoskins, the report of the Executive Board was adopted.)

SECRETARY MAYO: I have a resignation of Dr. Lawson of Ontario. The Executive Board recommend that it be accepted.

(On motion of Dr. Hoskins, the recommendation was adopted.)

SECRETARY MAYO: I have some more reports from the Executive Board. These recommendations were made to the Association last year; they were laid on the table, and they come up now for adoption.

It is recommended by the Executive Board that the Constitution and By-Laws be amended as follows: Section 7, Article G, by adding "Excepting members residing in countries other than the United States and Canada, the said ballot shall be returned within ninety days from the date of issue."

You remember I called attention last year to the fact that on a postcard vote the By-Laws provide that the ballot must be returned in thirty days. It is impossible to get a ballot to the Philippines and back under sixty days, and so it was proposed to change the By-Laws making it ninety days for members living in foreign countries to get their votes back to the Secretary.

(On motion of Dr. Hoskins, the recommendation was adopted.)

SECRETARY MAYO: The Executive Board also recommend that Article XI of the By-Laws be changed adding, "Excepting the Editor, Secretary, Business Manager and Treasurer, who shall assume their duties within thirty days following their election." At the present time the Constitution and By-Laws provide: "The officers of the Association shall assume their duties at the close of the annual meeting at which they are elected."

There is so much to be done at the time of the annual meeting, so far as the Secretary's office is concerned, that it is necessary to allow a little time to get the books straightened up before turning them over. That practice has been followed in the past as a matter of custom; we had to do it. This is a change in the Constitution and By-Laws to conform.

(On motion of Dr. Torrance, the recommendation was adopted.)

SECRETARY MAYO: The Executive Board also recommend to change Article V, Section 5, to read that the treasurer shall give an acceptable bond to the Executive Board. At the present time it reads he shall give bond in the sum of $5,000. That was provided when the Association didn't have much in the treasury. This recommendation was proposed by the Treasurer, Dr. Jacob. Now that the Association has $30,000 in the treasury, it is felt that the Executive Board should decide how much of a bond shall be furnished.

(On motion of Dr. Faust, the recommendation was adopted.)

SECRETARY MAYO: The Executive Board recommends that Paragraph L, Section 7, of the Constitution be amended by eliminating the word "yearly." I will read that paragraph.

"It shall be the duty of the Executive Board to consider and recommend yearly to the Association concerning the selection of Secretary and Editor and Business Manager of the JOURNAL of the American Veterinary Medical Association," etc.

The Board in recommending this, and looking toward the employment of someone who shall occupy the combined office of Editor and Secretary, find that they want to make this office rather stable and permanent, provided the services are satisfactory, and they think it would be better to eliminate the word "yearly."

(On motion of Dr. Torrance, the recommendation was adopted.)

REPORT OF SALMON MEMORIAL COMMITTEE

PRESIDENT KINSLEY: We will take up one short committee report, that of the Salmon Memorial Committee, by Dr. Hoskins.

(Dr. Hoskins read the following report:)

The Salmon Memorial Committee has made no effort during the past year to collect additional subscriptions to the fund. It is the judgment of a majority of the committee that it is inadvisable to extend further the efforts to increase this fund, started in 1915. President Kinsley has recommended that the fund be made immediately available for the financial assistance of worthy students endeavoring to obtain a veterinary education.

The amount collected, with interest to date, represented by cash in bank and Liberty Bonds, closely approximates $5,000. This amount invested at 5 per cent will yield $250 per year, and leave the capital fund intact. Your committee, therefore, recommends that the suggestion contained in President Kinsley's annual address be adopted and the matter placed in the hands of the incoming officers, with a view to making the income from the fund available during the coming college year.

SALMON MEMORIAL FUND COMMITTEE.
S. BRENTON, *Chairman.*
J. R. MOHLER.
H. PRESTON HOSKINS, *Secretary-Treasurer.*

On motion of Dr. J. F. DeVine of Goshen, N. Y., the report was adopted.

PRESIDENT KINSLEY: We have adopted a report and recommendations that the income from the Salmon Memorial Fund, which will amount to approximately $250 a year, be used for some needy student. Provision should be made for the application of this fund. I don't know who is to have charge of it.

DR. HOSKINS: It was the sense of the committee that the committee be discharged and that the incoming officers make whatever rules and regulations would be necessary to administer this fund. It was also the sense of the committee that recommendations for gifts from this fund come through the dean of the veterinary college which the student was attending. It was also the sense of the committee that the entire sum of $250 be not given to any one or any two students, but that greater good would probably come if the amount were divided so that it would help three or four or may be five. It very often happens that a veterinary student gets along toward the end of his course and $50 or $75 stands between him and the successful completion of that course. Doubtless there are men in the audience who have known of such cases. In keeping with the spirit contained in Dr. Kinsley's address, we believe the income from this fund at this time could be used in no better way than along that particular line.

SECRETARY MAYO: I move that the matter of the distribution of the Salmon Memorial Fund be referred to the Executive Board.

(The motion was seconded by Dr. Faust.)

SECRETARY MAYO: I think it is better to be referred to the Executive Board rather than to the officers for any one year. This fund and its administration is a more or less continuous and permanent proposition. Some of the officers at least will be changed from year to year, and the Executive Board, or somebody that takes the place of that Board in the reorganization, in my judgment, would be better able to look after that fund continuously than those who are just simply in for a year or so.

(The motion was carried.)

GREETINGS FROM DR. WRAY

SECRETARY MAYO: I received this morning a cable from Beaconsfield, England: "Present to the Association my best wishes for their good health and prosperity of the individuals and the profession generally. W. H. Wray." (Applause.)

ELECTION OF OFFICERS

PRESIDENT KINSLEY: The next order will be the election of officers. I wish to call your attention to some paragraphs in our Constitution and By-Laws. First, "No member shall vote at a regular meeting until he has registered and paid his entire indebtedness to this Association." Second, "Nominations for office, except as otherwise provided for by postcard ballot,

shall be made orally. A nominating speech shall not exceed two minutes, and the nominations shall not be closed until every member has had opportunity to present his candidate." Third, "The election is by a majority of all votes cast."

I just wanted you to understand the regulations under which we are operating. We are ready for nominations for President for the ensuing year.

DR. T. H. FERGUSON: I would like to place before this Association the name of Dr. W. H. Welch, of Lexington, Illinois, for President. (Applause.)

DR. TORRANCE: It gives me great pleasure, as a Canadian representative, to second the nomination. It is a great thing in the history of the Association to have a practitioner occupying the presidential chair. (Applause.)

DR. KIERNAN: The immortal Lincoln once said that a house divided against itself can not stand. This Association composed of virile, free men, naturally at times has divergence in views, but it shows the character of the personnel of this organization when they all can get together and unite on the officers of the Association. I take great pleasure in seconding the nomination of Dr. Welch. (Applause.)

DR. V. A. MOORE: It gives me great pleasure, also, to second the nomination of Dr. Welch. (Applause.)

DR. COTTON: I consider it an honor and privilege to second the nomination of Dr. Welch. (Applause.)

DR. T. E. MUNCE: What I have seen and heard at this meeting indicates to me that Dr. W. H. Welch, of Illinois, is to the veterinary profession, and particularly to the practitioners of the profession in this locality, what the unknown soldier was to France, England and to the United States. In view of the service rendered and the sacrifices made by this distinguished practitioner, I move that the nominations close and that the election of Dr. Welch be made by acclamation. (Applause.)

(The motion was seconded.)

PRESIDENT KINSLEY: The motion is out of order, but if there is no objection, it will be put.

(The motion was unanimously carried.)

DR. W. H. WELCH: Mr. President and fellow-members of the American Veterinary Medical Association: I thank you very sincerely for the distinguished honor that you have conferred upon me, and for the great confidence that you have expressed in me by electing me as your President for the ensuing year. I can only say I hope that as my election was made unanimous, all the events of the coming year may be as harmonious. I thank you. (Applause.)

PRESIDENT KINSLEY: Next in order is the election of Vice-Presidents. There are five Vice-Presidents to be elected. The usual procedure is that the five Vice-Presidents receiving the highest number of votes be duly elected, the one receiving the

largest number being first Vice-President, the one next in number Second, and so on. We are now ready for nominations for Vice-Presidents.

(The following nominations were made:)

Colonel McKinnon, of the Veterinary Corps, U. S. Army.

Dr. J. G. Eagle, Oklahoma City, Okla.

Dr. T. H. Ferguson, Lake Geneva, Wis.

Dr. J. H. McNeil, Trenton, N. J.

Dr. M. C. Baker, Montreal, Canada.

Dr. George H. Hart, Berkeley, Calif.

Dr. I. E. Newsom, Fort Collins, Colo.

Dr. E. P. Flower, Baton Rouge, La.

Dr. J. T. Jennemann, St. Louis, Mo.

SECRETARY MAYO: I asked Dr. Udall to nominate Col. McKinnon. Col. McKinnon has been selected to head the Veterinary Corps. There is nothing to this but a little honor, but some of us feel that it would be a decided help to him in his work in the Army Veterinary Service if you felt disposed to make him one of your Vice-Presidents.

PRESIDENT KINSLEY: The Chair will appoint Dr. Hoskins, Dr. Watson and Dr. Fitch as tellers.

We have yet to elect the Member-at-Large on the Executive Board, and I believe we can ask for nominations at this time.

DR. W. T. SPENCER: I want to place in nomination for this important position a veterinarian who can fill the position well. He has had experience as a practitioner and has served his country overseas. I nominate Dr. R. C. Julien, State Veterinarian of Indiana. (Applause.)

DR. MERILLAT: As a member of the Reorganization Committee of this Association, after a year's study of the proposed new Constitution, it appears to me that this is not a very good time to make any changes in the Executive Board, and for that reason I want to put in nomination the present incumbent of the office, Dr. Cassius Way, of New York. (Applause.)

DR. WHITE: I desire, for the reasons given and others which it is too hot to mention, to second the nomination of Dr. Way. (Applause.)

PRESIDENT KINSLEY: I appoint Dr. Cloud of Texas, Dr. Udall and Capt. Kelser as tellers.

While you are preparing those ballots, we have a very important officer, the Treasurer, yet to be elected. Whom will you nominate for your Treasurer?

DR. D. H. UDALL: I place in nomination the name of Dr. Jacob. (Applause.)

DR. STANFORD: I move he be elected by acclamation.

(The motion was seconded.)

PRESIDENT KINSLEY: Are there any further nominations? If not, I will accept the motion that Dr. Jacob be elected by acclamation.

(The motion was carried.)

DR. JACOB: I wish it were possible for me to entertain you with a speech while you are awaiting the results of the general election. However, I am not capable of doing that, and I simply take this opportunity of expressing to you my sincere appreciation. I hope that I will be able to serve you for the coming year in an efficient manner. I can assure you that I will try my best. (Applause.)

PLACE OF NEXT MEETING

PRESIDENT KINSLEY: Yesterday it was agreed that at this time we would consider the proposition of the meeting place for 1923. I wish to read again from the Constitution: "The time, place and duration of the regular meetings shall be fixed by the Executive Board within sixty days after the annual meeting, unless otherwise ordered by the Association at an annual meeting."

Dr. Mayo has some written invitations.

SECRETARY MAYO: These are invitations that have come to the Secretary's office. Official invitations from Omaha, Bureau of Publicity, Chamber of Commerce, Live Stock Exchange; Montreal, a telegram from Dr. Baker; a letter from the Secretay of the Missouri Valley Association to the effect that the Missouri Valley Association has extended an invitation to come to Omaha; Convention Bureau, West Side Association, New York City; San Francisco Convention and Tourist League; Detroit Convention and Tourist Bureau; Grand Hotel, Mackinac Island, Michigan; Chicago Association of Commerce; Convention Bureau, Chamber of Commerce, Des Moines; Merchants' Association of New York City; Hotel Traymore, Atlantic City, N. J.; Cincinnati, Chamber of Commerce and Merchants' Exchange. There are letters in connection with each of them.

DR. TORRANCE: I desire, on behalf of the Canadian profession, to present a most cordial invitation for this Association to hold the 1923 meeting in Canada. Only twice in the history of the Association has Canada been favored by a visit from it. The last occasion was eleven years ago. We believe it is time for you to come to see us again. I not only have an invitation from the profession of the Dominion of Canada, but the presidents of the associations of the Provinces of Ontario and Quebec are here to present in person the invitations of those two organizations.

We have an invitation officially from the city of Montreal, from the Montreal Board of Commerce, the Board of Trade, from the University of McGill, from Montreal University, from the Veterinary Faculty of that University. I can assure you that in Montreal you will find not only a warm welcome from the people, from the representatives of this profession, but you will find in that city a place of meeting where the noise will be

created only by yourselves and you won't be annoyed by street cars and other extraneous noises. If you want to make merry, you will find in that city everything that is desirable.

I feel that in presenting the claims of Montreal and of Canada to this organization it needs but a very short speech. I know that since the Eighteenth Amendment went into force in the United States there are only three classes of people who are satisfied with the conditions—those who never had a drink and never wanted one, those who still have a little, and those who have a little still. (Laughter.) Now in Montreal you don't need to provide your own; it will be provided for you. Come to Montreal and receive the welcome of the Canadian profession. (Applause.)

DR. M. C. BAKER: It is with a great deal of pleasure that I represent here today the veterinary surgeons of the Province of Quebec, having been asked by them to extend to you a most hearty invitation to come to Montreal for the 1923 meeting. I can assure you that you will receive there a most hearty welcome. Montreal is decidedly a convention city. We have very suitable places for holding conventions. We will do the very best we know how to make the event a satisfactory and a very memorable one for you all. It is very easy to get to Montreal by rail or by water.

I have also here today with me a letter from one who was very familiar to the former generation of veterinarians, and I presume he is still known to a great many of you here present today. I refer to Dr. Duncan McEachran. I have a long letter from him saying he will be most happy not only to have you come to Montreal, but if time permits and you feel able to do so, he will be most happy to receive you at his own house and give you a happy, hearty entertainment there in person. I hope sincerely that we shall have the pleasure of greeting the members of the American Veterinary Medical Association in Montreal in 1923. (Applause.)

DR. D. A. IRVINE: I speak as President and representative of the Ontario Veterinary Association in supporting the Montreal Association with their invitation to meet with them in Montreal next year. I will take no more of your time. (Applause.)

DR. TORRANCE: If the Association decides to come to Montreal next year, I think I can guarantee the presence of two or more representative members of our profession from England and from the Continent. It is some time since we have had the presence of distinguished men from the other side of the water, and I have the assurance of men who are able to give that assurance with every confidence that it can be carried out, and if the meeting is held in Montreal we can get representatives of our profession to attend from England, France and Belgium. I am sure that their presence at one of our Association meetings would add a great deal to its attractiveness. (Applause.)

DR. SPENCER: I desire to bring an invitation to this Association from the livestock interests of the Middle West. Omaha is located in the heart of the great livestock industry. A large per cent of the members of the American Veterinary Medical Association live in that territory, and it seems to me that it is important that we consider future prospects in locating our next meeting. We have in that locality 500 or 600 eligible veterinarians who would be good prospects if we could bring the meeting close enough to them so that they could attend. I happen to be Resident Secretary for the State of Nebraska, and I made an active campaign this year trying to get new members for our Association. I have found that the practitioners have put up the argument that they could never attend the American Veterinary Medical Association meetings because they are too far away. Now if we can bring this Association meeting to a central location where our present members can attend and where we will have the prospects of 300 or 400 additional members, I believe that it is worth while.

Besides the livestock industry, we have invitations from the Omaha Chamber of Commerce, the Nebraska Stock Growers Association, the Omaha Live Stock Exchange and several others. We shall be glad to have you come to Omaha; we are prepared to take care of you; we have ample facilities for handling the crowd that may come, and we have entertainment features that are unique. Those of you who have been through Omaha know something of the show that is put on there every year. It is done by an association of 6,000 or 7,000 business men, formed for the purpose of entertaining conventions and organizations that come to our city. We believe that it is the logical place for the next American Veterinary Medical Association meeting, and we will take care of you if you will come and visit us. (Applause.)

DR. H. B. TREMAN: On behalf of the Missouri Valley Veterinary Medical Association, I wish to second the invitation to the city of Omaha for the 1923 meeting.

DR. C. H. STANGE: This is the third time the veterinarians of Iowa have extended to this Association an invitation to meet in Des Moines, twice by coming before the Association and once by inviting the Association through the Executive Board. We don't have some of the refreshments that you might find in Canada, but we have lots of corn, and if those who have the little stills will bring them along, you will be all right. We haven't a great many other entertainment features, but we have in Iowa over 800 graduate veterinarians. We have State association meetings with an attendance of over 450, which shows the interest our veterinarians take in association work.

We believe that if you want to meet somewhere where it will be for the best interests of the Association, if you want to increase your membership, if you want to get in close touch with

the real agricultural problems, you can do no better than to come to the heart of the agricultural district—Des Moines, Iowa. (Applause.)

ELECTION OF OFFICERS

PRESIDENT KINSLEY: We are ready to report on the election of Vice-Presidents. They are as follows: First Vice-President, Col. J. A. McKinnon; Second Vice-President, Dr. T. H. Ferguson; Third Vice-President, Dr. M. C. Baker; Fourth Vice-President, Dr. G. H. Hart; Fifth Vice-President, Dr. J. H. McNeil. I declare the five names read elected as Vice-Presidents. (Applause.)

The vote on Executive Committeeman at Large shows a total of 175 votes. Dr. Way received 103, and is, therefore, elected the Member at aLrge. (Applause.)

DR. WAY: It is almost impossible for me to express to you my appreciation for this honor. Being a practitioner, I feel keenly the problems of the veterinary profession, especially in reference to the practitioners throughout the country. I trust that the members of the Association as a whole may at any time feel free to give constructive suggestions, criticisms, etc., that I may in any way assist in the futherance and the advancement of the profession through the membership on the Executive Board. These problems, it seems to me, are vital at this time. There are many questions relative to veterinary practice which must necessarily be considered in this reconstruction period and in this period when veterinary medicine is taking up more and more the question of prophylaxis and preventive medicine. I thank you sincerely for this honor, and I hope that I may be able to serve in a way that will be commendable and satisfactory to this Association. (Applause.)

PLACE OF NEXT MEETING

PRESIDENT KINSLEY: Are there any other invitations to be presented at this time?

DR. DEVINE: When I listened to the various invitations and saw the facial expressions of some of the older members, I realized what they suffered the past two years. In all fairness to them, and particularly to myself, I urge that we go to Canada. (Applause.)

PRESIDENT KINSLEY: Do you wish to vote and give an expression of choice to the Executive Board, or do you wish to decide the location of the meeting place at this time?

(General opinion seemed to be to decide the location at this time.)

(On motion of Dr. Hernsheim, seconded by Dr. Torrance, it was voted to go to Montreal for the 1923 meeting.)

PRESIDENT KINSLEY: According to your instructions and your voting, the next annual meeting will be held in Montreal.

SECRETARY MAYO: In a way I am very glad that the Association has decided to go to Montreal. There has not been a meeting held in the Northeast for many years, not since the Toronto meeting. In this Association we do not consider the imaginary line that stretches across the country. As this Association is exerting every year a more powerful and wide-reaching influence upon the veterinary profession of other lands, I believe that while our attendance may not be as large probably because of the distance, it will benefit our Association and our profession as a whole to go to Montreal next year. I hope that every one of you will begin to plan now to take this trip to Montreal. Most of you can do it, and it will be, I assure you, one of the great events of your lives if you have never been in that country. It will be a trip that you will look back to with great pleasure the rest of your life. (Applause.)

REPORT OF LIAUTARD MEMORIAL COMMITTEE

PRESIDENT KINSLEY: We have some very important committee reports. First we will have the report of the Liautard Memorial Committee, Dr. DeVine.

DR. DEVINE: Dr. W. Horace Hoskins, I believe, was the chairman of this committee, and he having died, as you know, the President asked me to assume the chairmanship. Unfortunately we have not been able to do anything constructive. All I can report is progress.

(On motion of Dr. DeVine it was voted that the report be received.)

REPORT OF COMMITTEE ON NECROLOGY

PRESIDENT KINSLEY: Next we have a report of the Committee on Necrology, Dr. Bemis.

(Dr. H. E. Bemis read the report, which follows.)

The committee on Necrology regrets to report the loss through death of fifteen faithful members of this Association to whom we are pleased to pay tribute at this time. A number of prominent veterinarians not members of this Association have also been lost to the profession. Most notable of these is the world famous Dr. Jacob Albrechtsen.

Among laymen whose work has been closely allied with many of our problems and who have ever been in sympathy with the work of the veterinarian but have now passed on we wish to mention Hon. W. C. Edwards, Senator in the Canadian Parliament and at one time member of the International Commission on Tuberculosis, and Dr. Henry P. Armsby, Director of the Institute of Animal Nutrition in the Pennsylvania State College. Records of their achievements are given in the JOURNAL for November, 1921, and January, 1922, respectively.

R. A. Archibald

Dr. R. A. Archibald, President and Manager of the Western Laboratories, Oakland, California. Dr. Archibald was born in Queens County, Ireland, in 1870. He came to the United States in 1887, entered the Chicago Veterinary College, and graduated in 1891. After graduating he specialized in bacteriology and became a promi-

nent worker in that field. He held the following positions successively: Assistant Bacteriologist of the City of Oakland, Professor of Bacteriology in Oakland College of Medicine and Surgery, and later a similar position in San Francisco Veterinary College. He was in charge of the food inspection and sanitary work in Oakland for sixteen years. During all of this time he was very active in association work, being three times elected President of the California State Veterinary Medical Association, Fourth Vice-President of the A. V. M. A. in 1914, and President in 1916. During the last five years he was a member of the Executive Board.

Among Dr. Archibald's contributions to veterinary literature may be mentioned the following papers: "Apparent Inconsistencies of Biological Diagnostics," "Preliminary Report on the Value of Leukocytic Extract from a Therapeutic Standpoint," "The Laboratory and Its Relation to Medical Science."

Dr. Archibald had been in poor health for three years following an attack of influenza, and died February 4, 1922. This marks the passing of one of the veterinary leaders of the Pacific Coast and a tireless and valued worker for the good of the veterinary profession in America.

Charles H. Babcock

Dr. Charles Henry Babcock was born October 16, 1865, and died on the anniversary of his fifty-sixth birthday. In early life he was engaged in the drug business but later completed the course in veterinary medicine and established himself at New Rockford, North Dakota. He was always very active in public affairs, being a member of the Board of Education of his city for several years and a member of the State Veterinary Medical Examining Board under three Governors. He was a prominent Mason and a faithful member of the A. V. M. A.

A. E. Cherry

Dr. A. E. Cherry was born in 1883 and died at Denver, Colorado, March 3, 1922. He was a graduate of the Michigan Agricultural College in 1915 and joined the A. V. M. A. in 1916. He had been in Government service at Manila and Fort McKinley, Philippine Islands, and later at Stotsenburg and Pampanga. Further details of his service have not been obtained.

J. A. Couture

Dr. J. A. Couture was born in Canada in 1850 and died March 12, 1922. He was one of the first graduates of the Montreal Veterinary College and after graduation became a skillful practitioner and a very diligent worker in the Department of Agriculture. He was at one time Superintendent of the Animal Quarantine Station at Levis and is given credit for preventing the spread of foot-and-mouth disease and contagious pleuropneumonia.

Dr. Couture was actively interested in improving the livestock situation in his community and in this way gained the love and confidence of a large number of farmers and stockmen. A beautiful tribute to Dr. Couture by Dr. F. Torrance was published in the May number of the JOURNAL.

Edgar W. Finley

Dr. Edgar W. Finley of Elwood, Indiana, died in May, 1922. The date of his birth has not been obtained. He graduated from Indiana Veterinary College in 1916, served in France during the World War, and located after his return in Elwood, where he was engaged in the practice of his profession.

Nelson T. Gunn

Dr. Nelson T. Gunn was born in 1880 and died of heart failure at Butte, Montana, November 28, 1921. After spending two years in the study of medicine at Leland Stanford University, he took up the study of veterinary medicine at San Francisco Veterinary College and graduated in 1915. For one year after graduation he was engaged in meat-inspection service at South Omaha, after which he took up practice at Butte, and was apointed District Deputy State Veterinarian. He was a member of the Montana Veterinary Medical Association and served as its President in 1918 and Secretary in 1920. He was secretary of the State Board of Veterinary Examiners at the time of his death. His pleasing personality and professional ability made his work as a State official a marked success.

Jacob Helmer

Dr. Jacob Helmer was born August 26, 1859, at Brandt, Pennsylvania, and died at Scranton, Pennsylvania, October 31, 1921. After finishing his work in the public schools he studied for two years at the State Normal School at Oswego, New York. In 1885 he entered the New York State Veterinary College. In 1891 Dr. Helmer became veterinarian to the Delaware. Lackawanna and Western Railroad Company, which position he held until his death. He had always been active in association work, having served as President and Secretary of the Pennsylvania State Veterinary Medical Association, member of the State Board of Veterinary Medical Examiners for fourteen years, and a member of the A. V. M. A., where he served for two terms as Secretary of the Division of Associated Faculties and Examining Boards.

Willard Linn

Dr. Willard L. Linn was born January 9, 1868, and died at Holcomb, Illinois, November 24, 1921. Dr. Linn graduated from the Chicago Veterinary College in 1890 and joined the A. V. M. A. in 1920. He was a member of the Illinois Veterinary Association and was an Assistant State Veterinarian.

Henry S. Lewis

Dr. Henry S. Lewis died of pneumonia January 24, 1922, at Chelsea, Massachusetts. Dr. Lewis was a graduate of the Veterinary School of Harvard University in the class of 1889. He joined the A. V. M. A. in 1899 and was a member of the first veterinary examining board for the State of Massachusetts.

Charles H. McVeigh

Dr. Charles H. McVeigh died at Hanna, Alberta, Canada, January 2, 1922. He was a graduate of the Ontario Veterinary College in 1900 and joined the A. V. M. A. in 1921. He was an inspector in the Health of Animals Branch of the Department of Agriculture and did his work in the Province of Alberta. The committee has no further knowledge concerning his achievements.

Arthur M. Perry

Dr. Arthur M. Perry was born in Van Wert, Ohio, December 10, 1883, and died in Omaha, Nebraska, September 29, 1921. He graduated from Cincinnati Veterinary College in 1916 and engaged in practice until appointed veterinary inspector in the Bureau of Animal Industry in 1917. He joined the A. V. M. A. in 1918. At the time of his death he was supervising inspector at one of the large packing establishments at South Omaha.

L. I. Walch

Dr. L. I. Walch was born at Burden, Kansas, in 1895 and died at St. Paul, Minnesota, January, 1922. He graduated from St. Joseph Veterinary College in 1918 and joined the A. V. M. A. in 1919. He was a second lieutenant in the United States Army and served with honor in France during the World War.

H. A. J. Winsloe

Dr. H. A. J. Winsloe was born in Liverpool, England, January 22, 1874, and came to America at the age of eight years. He died at Copperstown, North Dakota, November 22, 1921. Dr. Winsloe graduated from the Ontario Veterinary College in 1897 and joined the A. V. M. A. in 1911. He was engaged in the practice of his profession and had served as Assistant State Veterinarian of North Dakota. His home papers paid unusual tribute to him as a father, husband and citizen, beloved by the entire community.

William L. West

Dr. William L. West died at Belfast, Maine, in December, 1921. The committee regrets that it has little information concerning Dr. West other than that he was a member of the A. V. M. A.

William J. Waugh

Dr. William J. Waugh, of Washington, Pennsylvania, died August 16, 1922, at the age of 63 years. He was a graduate of the Ontario Veterinary College. He served as a civilian veterinarian in the United States Army under the old organization. For the last few years of his life he was connected with the Pennsylvania Bureau of Animal Industry while engaged in practice at Washington, Pennsylvania.

Jacob Albrechtsen

While this noted gentleman was not a member of the A. V. M. A., the Committee on Membership had decided to recommend that he be extended an invitation to be our guest at this meeting, and undoubtedly he would have been elected to honorary membership at this time. On account of his valuable contributions to our knowledge on the intricate problems connected with sterility among animals, it seems fitting that a brief review of his life work be recorded by this association.

Dr. Albrechtsen was born at Askely on the island of Moen, Denmark, October 14, 1859, and died at Copenhagen on September 11, 1921. During his early life he was a sailor and as such he visited many foreign lands. He later entered the Danish Veterinary College, from which he graduated in 1886 and began the practice of his profession at Nexo. All through his career he paid particular attention to the diseases of cattle. He did a great deal of work in combating tuberculosis through the Bang method. Later his special interest centered in the subject of sterility in cattle and mares, and it is in this connection that his name is known the world over. Among his writings on this subject are his first book, "Sterility in Cattle and Its Treatment," published in 1908, and "Sterility in Cattle, Its Causes and Treatment," which was published in 1916.

In the death of Dr. Albrechtsen the veterinary profession has lost a tireless worker, a keen observer and in every way a noted gentleman.

Resolutions

The following resolutions are proposed:

Whereas, It has pleased God to transfer to other fields of activity our members, friends and coworkers, R. A. Archibald, Charles H.

Babcock, A. E. Cherry, J. A. Couture, Edgar W. Finley, Nelson T. Gunn, Jacob Helmer, Willard Linn, Henry S. Lewis, Charles McVeigh, Arthur M. Perry, L. I. Walch, H. A. J. Winsloe, William L. West, W. J. Waugh, and Jacob Albrechtsen;

And whereas, No one of these can be removed without there being a realization of our loss and a desire to help carry the burden of sorrow;

Therefore be it Resolved, That we as an Association do now acknowledge the loss of these friends and coworkers in the building of the veterinary profession;

And be it further Resolved, That our sympathy be expressed to the members of the families of each of the departed and a copy of these resolutions be spread upon the records of this Association.

The wives of at least two of our members, Dr. Guy S. Jones of Rockwell City, Iowa, and Dr. C. A. Schaufler of Philadelphia, Pennsylvania, and the wife of one of our most faithful friends, Dr. N. Rectenwald of Pittsburg, Pennsylvania, have been taken from them during the year.

Therefore be it Resolved, That these members be extended the warmest sympathy of this association in an attempt to help them bear this the greatest of all sad bereavements, and that a copy of these resolutions be spread upon the records of this Association.

A. H. BAKER,
J. W. CONNAWAY,
W. B. CRAIG,
G. A. JOHNSON,
H. E. BEMIS, *Chairman.*

On motion of Dr. Hoskins the report was received.

REPORT OF COMMITTEE ON ABORTION

PRESIDENT KINSLEY: The next on the program is a report of the Committee on Abortion, Dr. Fitch.

DR. C. P. FITCH: The printed report will be presented as it is, but we have two other items that I wish to bring to your attention as a part of the report.

As you will note from reading the report, there are a number of facts and factors in connection with abortion disease which are yet very imperfectly understood. We would, therefore, urge that this Association take action to urge the experiment stations, research workers and all institutions engaged in the study of animal diseases to concentrate their efforts so far as is possible on the study of this infection to see if it is not possible to obtain the answer to a number of the questions which still remain unanswered.

At the meeting at Denver a subcommittee was appointed to study and standardize methods for the tests for this disease, and this subcommittee reports as follows:

The subcommittee of your Committee on Abortion, appointed to investigate and to make recommendations for the standardization of the biological tests for bovine infectious abortion, has found its task to be larger and more complicated than it at first believed it to be, or than is generally recognized.

The subcommittee has done a considerable amount of work during the year, particularly with regard to the agglutination test. The character of the suspensions of abortion bacilli to be used in this

test, the differences in the results obtained with the test through the use of different strains of abortion bacilli, the effects of different methods of growing the bacteria for suspensions, the effect of different preservative agents on suspensions, and various other factors which it does not seem necessary to enumerate at this time, have been studied, but should receive further attention before the results obtained can be correctly interpreted or should be reported.

The subcommittee recognizes that its work should be continued, and recommends that either it or a similar subcommittee with a different personnel should be active in the matter.

J. M. BUCK,
G. T. CREECH,
W. E. COTTON.

Dr. Fitch then read the printed report of the Committee on Abortion, which follows:

In its report of 1920 the Committee on Abortion presented a brief summary of the available knowledge on the disease widely prevalent throughout the world and variously known as slinking and dropping of calves, contagious, infectious and epizootic abortion, abortion disease, etc. This report was very favorably received, both because of its brevity and the direct and positive manner in which the statements it contained were made. Hence, your committee of this year, realizing that the latest obtainable knowledge on bovine infectious abortion, concisely and clearly stated, is urgently needed by all members of the profession, has concluded to present a report this year embodying additional information to the report of two years ago.

Name.—Though cattle may abort from various causes, only one kind of infectious abortion among cattle has been found to be both widespread and common. For this evil after due consideration it is recommended that the name bovine infectious abortion be retained.

Definition.—Bovine infectious abortion is characterized as a rule by an interference with the development of the fetus, frequently resulting in its premature expulsion, either dead or alive, viable or nonviable. There is also a frequent manifest inflammation of the fetal membranes and of the maternal cotyledons together with frequent retention of the afterbirth.

Cause.—The essential cause of bovine infectious abortion is *Bacterium abortus* (Bang). The proportion of abortions due to other causes is relatively small. This germ possesses peculiar biological requirements which are found in the pregnant uterus and in the udder. The microbe localizes in these places and has been found in the regional lymph nodes of the udder and uterus. In the udder it often persists indefinitely, while in the postparturient uterus it has been isolated after approximately two months, but usually can not be found after three weeks. It is commonly found in the stomach, intestines, liver and other organs of the aborted fetus.

In the bull the bacterium has been found in the reproductive organs, seminal fluid and urethral discharges. Bulls do not show so high a percentage of infection as do cows.

Bacterium abortus (Bang) has been found to remain alive and virulent for many weeks in the material in which it is expelled from the animal. It is relatively easily destroyed by disinfectants and natural germicidal agents and is not known to multiply in nature outside the animal body.

Channels of Infection.—Infection with *Bacterium abortus* (Bang) occurs through the digestive tract. That it may occur through other channels (genital tract, urethra, etc.) has not yet been definitely proved.

Channels of Elimination.—*Bacterium abortus* (Bang) is disseminated by uterine discharges, aborted fetuses and fetal membranes

of infected cows. The milk of such cows and the seminal fluid and urethral discharges of infected bulls often contain the germ.

The products of seemingly normal parturitions of infected cows, that is, fetal membranes, uterine discharges, the surface of calves and their alvine discharges, frequently harbor abortion bacilli and are dangerous.

A cow may be the carrier and disseminator of the disease without showing symptoms of her condition.

Patholcgy.—Bacterium abortus (Bang) produces an inflammation of the chorion and of the fetal and maternal cotyledons in the pregnant cow. No significant pathological changes have been observed in the udder and fetus. Abscessation and other changes in the genital organs have been found in the bull.

Diagnosis.—The diagnosis of bovine infectious abortion is possible through the study of the history and condition of the herd, by means of the serum tests (agglutination and complement fixation) and bacteriological studies of infected material.

Sequelæ.—In this disease complications are frequent. They include inflammation of various parts of the reproductive organs, which may lead to temporary and at times permanent sterility, and interference with milk and flesh production.

The micro-organisms most commonly found in connection with these conditions are the common pyogenic bacteria.

Prevention and Control.—The attempt to control bovine infectious abortion should conform to the principles of general sanitation and sexual hygiene, making the efforts specific in so far as our knowledge of the etiology of the disease permits. Some of the more important measures to be practiced are as follows:

(a) The use of maternity stables and pens for *all* cows that show signs of approaching parturition, and the segregation of such cows until all discharges have ceased.

(b) The isolation and care of all aborting cows and their segregation for a period of 60 days or until no evidences of abnormal conditions in or about their reproductive organs remain.

(c) Permit no animal with diseased genital organs to be served by the bull.

(d) The male animal should be kept in a separate pen apart from the herd. Breeding should be carried out on neutral ground. The female should be segregated after service, preferably so tied that she can not lick herself until all danger of leakage of infected seminal fluid from her vagina has ceased.

(e) Consider raw milk as an infective agent for all bovine animals except young calves. Precautions should be taken to prevent spilling milk from infected sources.

(f) The injection of living abortion bacilli at the proper time into members of infected herds has been shown to reduce the number of abortions. It must be kept clearly in mind that vaccination against infectious abortion has not passed beyond the experimental stage, and that the suspensions of living abortion bacilli now obtainable often are worthless. The published tests on the use of dead abortion bacilli have failed to establish their positive value in the treatment or control of abortion.

(g) The possibility of transmission of bovine infectious abortion to other species of animals, particularly swine, and from swine to other animals, particularly cattle, should be given proper attention and measures inaugurated which would effectively prevent transmission.

A. EICHHORN,
T. H. FERGUSON,
E. C. SCHROEDER,
F. M. HAYES,
C. P. FITCH, *Chairman.*

On motion of Dr. Fitch, the report was received.

REPORT OF COMMITTEE ON PREVENTION AND CONTROL OF ANIMAL DISEASES

PRESIDENT KINSLEY: The next on the program is the report of the Committee on Prevention and Control of Animal Diseases, Dr. Turner.

(Dr. Turner read the report, which follows.)

At the 1921 meeting of the American Veterinary Medical Association at Denver, Colorado, a paper was presented on "The Importance of Preventive Measures in Repressing Animal Diseases." It contained the following suggestion: "We recommend that this association appoint a committee on disease prevention to consider the above suggestions and make additions; that the committee report at the next meeting of this Association." This recommendation was duly adopted, and in accordance therewith President Kinsley appointed the following committee: George H. Hart, I. E. Newsom, Leon G. Cloud, U. G. Houck, Henry W. Turner, Chairman.

In this report we have considered disease prevention from the standpoint of prevention of transmissible diseases of animals and poultry. It was decided to present it in the form of a descriptive outline. A tentative one was prepared and a copy given to the members, assigning each a different part to study and report upon.

In order to facilitate the committee's work, we deemed it advisable to subdivide the subject as follows:

Causes.	Immunization.
Modes of dissemination.	Quarantine.
Hygiene.	Education.
Diagnosis.	Helpful agencies.

OUTLINE OF CAUSES

Causes:
- Predisposing causes:
  - Remote:
    - Age.
    - Sex.
    - Heredity.
    - Hygiene.
    - Labor.
    - Climate and seasons.
  - Immediate:
    - Dietetics:
      - Unbalanced ration.
      - Deficiency:
        - Mineral.
        - Vitamins.
    - Mechanical injury.
    - Association with other species of animals.
- Exciting or biological causes:
  - Animal:
    - Protozoa.
    - Metazoa.
  - Vegetable:
    - Molds.
    - Yeasts.
    - Bacteria.
  - Filterable virus.
  - Unknown virus.

CAUSES

In considering the causative factors of the transmissible diseases of the domestic animals one always has uppermost in mind how the

knowledge of these factors will assist him in devising means for prevention and control. In all the transmissible diseases there are certain predisposing factors which influence not only the incidence of infection but also to a greater or less extent the course and severity of the disease. We all know that in some affections age and heredity play important parts as predisposing factors, and for that reason we take special care to protect certain age classes against particular types of infection and to eliminate from breeding animals whose offspring regularly incline to disease.

Probably today the most serious thought in matters pertaining to the avoidance of predisposing causes is given to the subjects of hygiene and dietetics. Adequate hygiene measures include proper stable construction and management so that there is secured suitable ventilation and sanitation, as well as proper exercise and care of the animals. A good example of the practical application of such measures alone in the combating of disease is the work initiated by the Zoological Division of the Bureau of Animal Industry in McLean County, Illinois, where parasitism and some of the common bacterial infections of pigs are being successfully controlled.

The prime importance of maintaining a proper diet in the prevention of diseases can not be questioned. Evidence is accumulating to show that some of the diseases once considered strictly transmisible are quite likely caused by a deficiency in the diet. (Black tongue in dogs now appears to be a pellagra-like disease.) It has even been suggested that dietary deficiency may be one of the chief predisposing causes of hemorrhagic septicemia.

The exciting causes of the communicable diseases comprise three great classes of parasites and viruses, namely: (1) The animal parasites (protozoa and metazoa); (2) vegetable parasites (molds, yeasts and bacterial); (3) filterable viruses. A complete knowledge of these causative agents is essential in order to determine the best means of prevention and treatment of disease. In dealing with diseases caused by the first class of parasites, prevention and control are for the most part dependent on the application of quarantine and hygiene measures. The diseases engendered by the second and third classes include some in the prevention of which not only quarantine and hygiene measures find application, but also biological products are of very great value. The use of biologics in combating transmissible diseases is becoming more and more general, and for that reason it should be the aim of science not only to seek means for preparing new and more effective products, but also to eliminate as fast as possible the dangerous and worthless products now in use. Our efforts should be increased to stimulate interest and activity in research work to determine as soon as possible the causes of diseases which are now unknown.

OUTLINE OF MODES OF DISSEMINATION

Modes of Dissemination of the Causes:

Direct:
- Introduction of animals or poultry:
  - History.
  - Physical and special examinations.
  - Animal.
- Animal products:
  - Virus—living cultures.
  - Slaughtering establishments.
  - Reduction plants.
  - Hides.
  - Excreta.
  - Milk food products (unsterilized).

Indirect:
- Parasites.
- Insects.
- Birds.
- Feeds:
  - Contaminated; infected.
  - Improper; unbalanced.
- Water:
  - Streams, ponds, bogs.
- Equipment:
  - Stockyards, cars, ships.
  - Wagons, trucks, crates.
  - Public yards, watering troughs.
  - Utensils, feed sacks.

MODES OF DISSEMINATION OF THE CAUSES

In the practice of prevention of transmissible diseases of animals it is essential to understand the manner in which the exciting causes of disease are disseminated. This requires a knowledge of the agents of infection and their modes of entrance into and egress from the body, as well as the manner they are carried from animal to animal and from place to place.

Modes of infection.—Disease-producing organisms most frequently gain entrance into the bodies of healthy animals through the digestive tract, respiratory tract, generative organs, eye, and through abrasions in the skin, mucous membrane or by bites of insects or animals.

Pathogenic micro-organisms with few exceptions do not multiply outside the bodies of animals or lead anything but a parasitic life.

The specific organisms of disease are transmitted most frequently by animals through their excretions, secretions and products; either directly or indirectly by means of animal carriers or through such intermediate agencies as food, water, insects, etc., which may be infected or contaminated by pathogenic micro-organisms.

Direct infection is the transference of the specific causative organism of disease by actual contact between diseased and healthy animals. This is the most common means by which disease is spread.

Droplet infection is direct aerial infection. The infectious material is transmited directly from animal to animal through the air at short distances by coughing or sneezing.

Indirect infection.—The exciting cause of disease in this form is carried by some infected object, animate or inanimate, acting as intermediary, such as infected foods, water and air; also by insects.

Data on dissemination of disease by air are scanty. In order to convey the micro-organisms through the air it must contain dust or mist on which the organisms are carried.

Insects as indirect carriers of disease were first definitely demonstrated by Theobald Smith in 1893 in the case of the tick and Texas fever in cattle. Diseases are carried by insects in two ways, biologically or mechanically. Biologically, the insect is the intermediate host of the causative organism. Mechanically, the virus of disease may be carried in a number of ways by the contaminated insect. Insect-borne diseases generally are confined to the immediate locality of the breeding places of insects.

Animal carriers.—All infected animals are potential carriers. Some animals harbor and disseminate the specific organisms of disease without showing any recognizable symptoms. They may transmit the causative organism of disease, either directly or indirectly, and are doubtless responsible for many outbreaks of disease where the origin can not be explained.

The most authentic case of this class of infection in medical annals is that of "Typhoid Mary," the cook who left a trail of infec-

tion in three States, six families and twenty-six people. In veterinary medicine abortion disease, tuberculosis and other diseases may be disseminated in this obscure manner.

OUTLINE OF HYGIENE

Hygiene:
- Animal hygiene:
  - Individual hygiene.
  - Breeding.
  - Age.
  - Care, exercise, work.
  - Sanitary habits.
  - Herd or flock management.
  - Herd records—breeding, feeding, production.
  - Feed and water.
  - Association with other species of animals.
- Environmental hygiene:
  - Site.
  - Altitude.
  - Climate, seasons.
  - Sunlight, atmospheric conditions.
  - Topography, soils, drainage.
  - Water supply.
  - Stream pollution.
  - Sanitation.
  - Disinfection, disinfectants. fumigation.
  - Transportation carriers.
  - Building construction:
    - Relative location:
      - Residence.
      - Neighbors' buildings.
      - Hog pens and other buildings.
      - Chicken houses and sheds.
      - Paddocks and pastures.
    - Material.
    - Ventilation, light, air space.
    - Arrangement, equipment.
    - Drainage, sewage disposal.
    - Manure and urine disposal.

HYGIENE

This is a field that with a comparatively few exceptions has been given but scant attention in animal husbandry. Woeful lack of appreciation of its importance is the cause of much financial loss to the livestock industry. Regulations, municipal, county and State, in all parts of the country, forcing improved conditions under which milk production was obliged to be carried on, have greatly improved dairy farm hygiene. Moreover, premise conditions have been wonderfully improved upon in connection with the administration of transmissible animal disease control campaigns. The more artificial the breeding, production and surroundings of our herds become, the more must additional factors be brought into play to prevent disease processes. This has its direct analogous situation in the human family, which necessitated the development of elaborate hygiene and sanitary measures in our modern large cities which were unknown before they developed. Animals properly bred, fed and cared for have the constitution and stamina to carry on their functions under artificial conditions and still remain resistant to disease.

In the swine industry we see the most widespread lack of appreciation of the ordinary principles of hygiene. Factors tending to lead to poor hygienic surroundings are the ones furnishing the means

for prolonging the life of pathogenic organisms outside the bodies of the host animals. Recent observations have definitely shown that feeder steers make better gains in the open, even in very cold weather, when protected from winds and storms by sheds, than when inclosed in the ordinary barn.

OUTLINE OF DIAGNOSIS

Diagnosis:
- History:
  - Individual.
  - Herd (record of:)
    - Births.
    - Deaths.
    - Additions.
    - Removals.
- Symptoms.
- Allergic tests.
- Laboratory examinations:
  - Serological.
  - Bacteriological.
  - Pathological.
  - Animal inoculations.
  - Parasitological.
- Necropsy.

DIAGNOSIS

The final diagnosis of a disease must rest in proving the presence of the specific organism, since we are accustomed to believe that each transmissible disease is due to a single cause. The presence of the organism may be determined by means of history symptoms, allergic tests, laboratory examinations and necropsy. The method varies according to the disease under consideration and the amount of accumulated knowledge on the subject. The tendency is, however, to lay less stress on the symptoms and lesions, and more on the more recent methods which have been developed. While from the standpoint of accuracy in diagnosis all possible encouragement should be given to research workers in order that better methods may be devised, yet veterinarians should not allow the laboratory methods to lessen their keenness of perception in determining the presence of charactristic symptoms or lesions of disease. It seems that there is real danger of losing the art of physical diagnosis in depending too much on laboratory methods.

Since, however, laboratories will in the future be used more than in the past, it is quite important that the men in the field familiarize themselves with the proper selection and packing of material to be sent to laboratories, and that they also have sufficient knowledge of the limitations of the laboratory diagnostician, so that the proper value can be placed upon the report received. There is a strong probability that too much dependence is placed on the laboratory; whereas the real diagnostician should be the man who has seen all of the conditions including the laboratory report. In other words, the laboratory worker should be an aid to the practitioner in making the diagnosis, and not assume to make the diagnosis for him.

OUTLINE OF IMMUNIZATION

Immunization:
- Active:
  - Bacterins.
  - Vaccines (proven):
    - Virulent.
    - Attenuated.
- Passive:
  - Serums:
    - Antitoxic.
    - Antibacterial.

IMMUNIZATION

Before this method of controlling disease is decided upon, it should be definitely determined that there is no immediate possibility of actual eradication of the disease. Eradication should be the chief aim, and immunization used only where eradication seems impracticable. This view can be illustrated by saying that immunization against foot-and-mouth disease in the United States under our present conditions would be ill advised, whereas immunization against blackleg should be strongly urged.

Having decided on immunization, any discussion of proper agents in individual maladies would lead us too far afield and out of the confines of the territory to be covered in this report. However, a word of caution which has been expressed many times before may not be amiss here. When Von Behring found diphtheria antitoxin, the more optimistic jumped to the conclusion that by the use of similar products all infectious diseases would soon be things of the past. This optimism was short-lived, and it was soon discovered that antitoxins were possible only in very few diseases, and are practicable in a still less number. Vaccines, bacterins and antiserums have worked their miracles in the alleviation of many of our worst maladies, but each one of these agents seems to have quite definite limitations, and once these are established they should be quite definitely adhered to.

Here again liberal appropriations for research are urged, in order that immunizing agents may be developed for diseases where they are not now used, and that those at present may be improved. It must not be forgotten that typhoid bacterin as used in the English Army in South Africa was practically worthless, owing to the fact that it was heated to 60 degrees C. in its preparation, whereas a bacterin heated to from 52 to 54 degrees C. removed typhoid fever from the list of important diseases in the late war.

We recommend the action of the United States Bureau of Animal Industry in stopping the manufacture of blackleg vaccine at Government expense, since an agent that is so well known and so universally used has reached beyond the experimental stage and is no longer proper material for Government distribution. Governmental agencies are properly active in the discovery and introduction of new immunizing substances, but manufacture and distribution of well-known agents should be in the hands of commercial firms under official supervision.

OUTLINE OF QUARANTINE

Quarantine:

- National quarantine:
  - Importations.
  - Interstate movement.
  - Special quarantine.
- State quarantine:
  - County.
  - Township.
  - Municipal.
  - Premise.

Final disposition:
- Slaughter.
- Release.

- Quarantine regulations:
  - Federal.
  - State.
  - Municipal.

QUARANTINE

Since early in the history of medicine quarantine has been regarded as essential in the prevention and control of transmissible diseases. The value of quarantine depends upon the completeness of the

isolation of the animals and of the infected territory placed in quarantine. The movements of persons and animals can be controlled, but it is difficult to prevent the spread of infection from quarantined animals through rodents, birds and insects of various kinds. In order to establish the most effective quarantine, measures must be employed to prevent effectually virus from being carried from sick to well animals. The most complete quarantine ever established in this country provided for the retention of the suspicious and diseased animals on an island; they were confined to screened stalls and were constantly under the observation of attendants.

National and State livestock sanitary authorities are empowered by existing laws to establish and maintain quarantine as occasion requires for the protection of the public health and the livestock industry of the country. Uniformity in State quarantine laws and regulations would be to the advantage of all concerned, and efforts should be made to obtain such uniformity, which should be in harmony with our National laws and regulations.

OUTLINE OF EDUCATIONAL MEASURES

Educational:

Medical units:
- Veterinarians, physicians, bureaus of animal industry.
- Health departments, hospitals.
- Medical and veterinary colleges.

Institutes of learning—universities, agricultural colleges, veterinary colleges.

Associations:
- Grangers, club meetings, fairs, institutes, veterinary clubs.
- Harvest homes, stockmen's meetings, reunions.

Extension workers.

General public.

Law-enforcement agencies.

Owner, attendants.

EDUCATION

Public support is an essential factor in all disease prevention. To bring about a proper attitude the public must be educated to recognize the necessity of this important subject. After a knowledge of the predisposing and exciting causes of animal diseases and means of preventing them are ascertained by the investigator, this knowledge must be disseminated to the profession, the stockman and the general public in order for it to be applied. Only so rapidly as the truth in regard to disease processes after being elucidated is generally accepted, just so rapidly will progress be made in disease prevention. Failure on the part of the public, due to lack of sufficient education, to accept scientific knowledge in regard to disease has been a potent factor in retarding progress of prevention. Thus in the Texas fever tick eradication, as long as ten years were required to free a comparatively small area of the tick, but after such a demonstration and the consequent public acceptance of the same, all the rest of some States were cleaned in half the time required to clean the small area.

Once education by means of the spoken, writen and printed word and by demonstrations has been accomplished, progress is comparatively rapid. It is important in such education that truths only be given wide dissemination. Efforts to educate must be directed along constructive lines and great care used by men in positions of responsibility and leadership not to overestimate the value of certain truths, thereby giving a false sense of security which may result in loss of confidence or severe reaction of mass opinion. For example, it is just as important to lay stress on the limitations of the tuber-

culin test as it is to extend the knowledge of its essential place in preventing the spread of tuberculosis. All phases of the industry involved must be considered in educational programs. Efforts should be made to overcome the lethargy and indifference of so many stockmen in regard to disease until it is actually decimating their flocks or herds.

There are at present many agencies for disseminating information in regard to animal disease prevention which are tabulated. The veterinary profession must continue to be the source from which the subject matter for this purpose is derived. At times leads from researches in human medicine have been of valuable assistance, just as scientific facts elucidated in comparative medicine have opened the way for the amelioration of human ills. Veterinarians must therefore recognize the responsibility of leadership in regard to animal disease prevention and keep informed in regard to its various phases, even though they may not for the present be directly interested in preventive educational campaigns and control measures. While the record of the profession stands high in the application of preventive medicine, great things are still before us to be accomplished. Our veterinary colleges can be of service in this regard by instilling into the minds of prospective veterinarians early in their college curriculum the importance of this phase of our activities. While we are not ready at this time to suggest that veterinary students, during their professional curriculum, should specialize in disease prevention, as has been suggested for the medical students in order to turn out properly trained public health officials, we nevertheless feel this is a matter that should be placed before the veterinary student body in such a way as to show them the advantages of it to their future, whether they are in the rôle of public official or practitoner.

OUTLINE OF HELPFUL AGENCIES

Helpful Agencies:

Sterilization, pasteurization.
Health surveys, statistics.
Enforcement methods.
Muzzling, dipping.
Special measures for special diseases.

HELPFUL AGENCIES

In the prevention of transmissible diseases of animals all agencies which may assist in any way should be considered and used.

Sterilization or disinfection should be employed to destroy any pathogenic micro-organisms that might be transmitted through the use of contaminated equipment.

Pasteurization should be used where there is danger of conveying disease-producing organisms through food or drink.

Health surveys to determine the extent of transmissible diseases should be made by trained and efficient investigators so as to enable regulatory authorities to prevent the spread of disease. In making these health surveys careful consideration should be given to every species of animal that might be affected, susceptible, or that might be a means of transmitting the disease. Accurate records should be kept of such surveys and filed with the proper authorities for reference in making future investigations or in compiling statistics. Accurate and reliable statistics should be published so that not only the amount of infection can be estimated, but in order that the losses can be shown to lay stress upon the importance of the use of preventive measures.

Proper quarantine methods and enforcement of sanitary measures are important agencies to be employed in the suppression and control of transmissible diseases.

In some diseases more strict regulations and measures must be used than in others, as in foot-and-mouth disease, anthrax, glanders and hog cholera.

State livestock sanitary officials should have full charge of livestock enforcement laws in every State and should be assisted by county officials in the enforcement of laws when they come within the bounds of such county.

Muzzling and proper confining of animals affected with certain diseases should be strictly adhered to and are very essential in controlling such a disease as rabies. Some diseases that are caused by parasites can be controlled or exterminated by one or a series of dippings. Dipping is used principally in the control and prevention of splenetic or Texas fever and scabies. These methods have proved effectual as well as economical to the livestock industry of the infected districts.

All of these agents are essential and should be kept in mind when combating transmissible diseases.

Briefly, this completes the work of the initial Committee on Prevention of Transmissible Diseases. This report has dealt with the subject in a general way. However, we would suggest that a committee of similar function be continued in this Association, and that future reports should be confined to specialized topics.

GEORGE H. HART,
U. G. HOUCK,
L. G. CLOUD,
I. E. NEWSOM,
HENRY W. TURNER, *Chairman.*

PRESIDENT KINSLEY: This is a special committee, and if it is your desire that the committee be continued you should make a motion accordingly.

DR. TORRANCE: I move the report be received and the Commitee continued.

(The motion was seconded and carried.)

(Proceedings to be continued)

PROFESSIONAL INTERESTS GUARDED IN FRANCE

In France there is a "National Syndicate of Veterinarians" which is very watchful in guarding the interests of the profession. This organization recently protested to the Ministry of Agriculture against the designation of two persons as "veterinarians" in an award announced in the *Official Journal,* when those persons were not graduate veterinarians and were therefore not entitled to that title. Investigation developed the fact that the men were merely practitioners of castration. An official correction was published.

In another case an empiric was prosecuted for appropriating the title "veterinarian," with the result that, in addition to a fine of 300 francs, the judgment was ordered to be advertised and posted at his expense.

OTHER MEETINGS

VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY

The thirty-eighth semi-annual meeting of the Veterinary Medical Association of New Jersey was held at Asbury Park on July 13 and 14, with headquarters at the Hotel Marlborough. There was a large attendance of members, their wives and friends.

A very interesting program and social time was enjoyed. The Hon. C. E. F. Hetrick, Mayor of the city, being unable to attend, sent a representative to welcome the association to the city.

A delegation of officers from the U. S. Army explained the Officers' Reserve Corps and requested a few veterinarians to join. The association took action to cooperate with the Army relative to seeing that New Jersey furnished her quota of reserve veterinarians.

Mr. C. D. Cleveland, of Eatonstown, presented the statistics of the dairy industry in New Jersey, to the association. His talk caused a long discussion on milk problems, with special reference to pasteurization and tuberculin testing.

Mr. Hunter of Annandale gave a talk on swine problems confronting a breeder.

Dr. Cassius Way of New York covered the subject of breeding problems very thoroughly. He thinks immunity to abortion is established. New outbreaks are due to new infections from different organisms. The most difficult condition he and his assistants feel they have to deal with is inflammation of the genitals. He demonstrated the use of a forceps to attach to each side of the cervix uteri to draw out the anterior wall of the vagina and cervix for examination.

Dr. Wm. Gall told the association the system he used in eradicating tuberculosis from Mattawan's milk supply. He said 14 per cent of the cows supplying Mattawan were tuberculous.

Dr. Way made the statement that human glandular tuberculosis of bovine origin is as rare in New York today as glanders, due to the pasteurization, tuberculin testing, and certification of milk. The pasteurization of certified milk is now being contemplated in order to check diseases spread by man.

Dr. E. W. Smillie of the staff of the Rockefeller Institute for Medical Research read an article on the experiments carried on by Dr. Theobald Smith and his assistant, Dr. Little, on the significance of colostrum to the new-born calf and the use of cow serum as a substitute.

These experiments seemed to indicate that colostrum checked the prevalent trouble of calf scours. Cow serum given per os seemed to be a good substitute while serum per os and intravenously gave excellent results.

These are new experiments that may prove of great benefit to the stock industry.

These papers, together with further experiments, are to be printed in the *Journal of Medical Research*.

Dr. B. M. Lyon of Pearl River gave the history of the discovery of the single-dose vaccine against rabies in dogs. He gave great credit to the Japanese who first prepared it.

From the experiments carried out in the United States and the trials given this single-dose method in actual outbreaks, it appears to rank with the smallpox and hog-cholera vaccine for efficiency.

A very pleasant social time was enjoyed by all. An orchestra concert and singing were given in the Ocean Grove Auditorium. Some enjoyed the dancing on the pier, while others took in, or were taken in by, the various amusements common to the seashore resorts.

A dip in the ocean and a stroll along the boardwalk were additional attractions.

The 39th regular annual meeting will be held in Trenton, N. J., on the second Thursday in January with headquarters at the Trenton House.

At this meeting the election of officers and regular routine business will be transacted.

P. B. SILVESTER, *Secretary*.

MONTANA VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Montana Veterinary Medical Association was held at Billings July 26 and 27, 1922. About thirty-five veterinarians were present at the meeting, and the attendance at every session during the two days was practically 100 per cent.

The morning session of the first day was devoted to business and the address of the retiring president, Dr. C. H. Stevens. The afternoon and evening sessions were occupied with a number of very interesting and instructive addresses and papers. A very successful clinic was held under the general direction of Dr. N. B. Smith of Billings during the forenoon of the second day. The association was entertained with a dairy lunch at the Yellowstone Creamery, followed by an address by Mr. V. E. Sampsel, president of the Yellowstone Creamery Company. After lunch a clinic was held at the Yellowstone Packing Company on two reactors to the tuberculin test. An afternoon meeting was then held, at which several papers were read, and the new business of the association was transacted, including the election of officers. The business of the association having been completed, the evening of the second day was devoted to relaxation in the form of the annual banquet, followed by a musical program and a number of snappy after-dinner talks. A feature of the evening was a short visit from the Assistant Secretary of Agriculture, C. W. Pugsley, who was in Billings for a short time on a trip across the State.

In connection with this meeting a conference of Federal inspectors and State district deputies was held, to discuss the cooperative work in eradication of tuberculosis.

The following addresses and papers were delivered:

"Purification of Farm Water Supplies by Chlorination," Dr. R. C. Main, City Health Officer of Billings.

"Feeding In Its Relation to Disease," Dr. W. J. Butler, Helena.

"Coccidiosis In Cattle," Dr. E. D. Nash, Helena.

"Hemorrhagic Septicemia in the Buffalo in Yellowstone Park," Dr. Neil Plank, U. S. Bureau of Animal Industry.

Address by W. L. Stockton, President of the Montana Dairymen's Association.

"Production of Clean Milk," R. J. Posson, Market Milk Specialist, U. S. Bureau of Animal Industry.

Review of Report of the Tuberculosis Conference in Chicago, Dr. Rudolph Snyder, U. S. Bureau of Animal Industry.

Address by Mr. V. E. Sampsel, President of the Yellowstone Creamery Company.

"Epithelioma of the Eye in Hereford Cattle," Dr. M. E. Knowles, Helena.

"Veterinary Problems of the Summer Range," Dr. A. C. Morrow, Dillon.

"The County Agent and the Veterinarian," Dr. H. Welch, Bozeman.

Mr. J. H. Burke, President of the Montana Stockgrowers' Association, was to have addressed the meeting, but was unable to attend.

The officers elected for the coming year were: O. L. Devore, of Bozeman, President; W. E. Heath, of Columbus, Vice President; and H. Marsh, of Helena, Secretary-Treasurer.

The 1923 meeting will be held at Helena.

HADLEIGH MARSH, *Secretary.*

ONTARIO VETERINARY ASSOCIATION

The annual meeting of the Ontario Veterinary Association was held in the Recreation Room of the Harris Abattoir on August 9 and 10. While the attendance was not so large as at the winter meeting, the enthusiasm was great, and everyone appeared to think that his time was well spent listening to the various addresses or joining in the discussions.

In his opening address, the President, Dr. J. A. Campbell, observed that the association was paying attention at this convention to subjects that had heretofore not been featured—"The Better Sire Campaign," "The Poultry Industry," and "Bacon Grading." He urged the necessity of the veterinarian in the future asserting himself as an authority on these subjects. Dr. Campbell referred to the visit of a deputation representing the O.V.C. to the Hon. W. R. Motherwell urging the provision of more adequate laboratory facilities for coping with animal diseases and for research work along veterinary lines. He stated that there was every indication that this visit would bring definite results in the near future.

The minutes of the last annual meeting were read and adopted, and the Secretary handed in his resignation, which was not accepted. It was moved by Dr. Morgan of Shelburne, seconded by Dr. Short of Erin, that the association pay a fixed yearly sum to the Secretary.

Dr. T. B. Buckley moved that the fee to the Ontario Veterinary Association be raised to five dollars, this fee to include subscription to the *Canadian Veterinary Record*. Dr. Bur-

rows seconded this motion which was carried without much discussion.

Letters from the following were read, regretting their inability to be present: Drs. H. Perley and J. H. Blattenburg and the Hon. Manning W. Doherty.

The election of officers next took place, Drs. Torrance and McGilvray acting as scrutineers. The officers elected for the ensuing year are: President, D. A. Irvine, Toronto; 1st Vice President, T. B. Buckley, Toronto; 2d Vice President, C. L. Morgan, Shelburne; Executive Committee, H. E. Batt, Guelph; D. R. Caley, Bracebridge; J. Dunn, Barrie; W. J. R. Fowler, Toronto; C. D. McGilvray, Guelph (ex-officio member). Secretary-treasurer and Registrar, J. S. Glover, Toronto; Legislative Committee, O. H. Duncombe, Waterford; J. P. Fitzgerald, Hillsdale; J. C. Brown, Burford. Educational Committee, A. R. B. Richmond, Toronto; J. McFadzean, Arthur; W. J. Morgan, Kingston; J. Porter, Brantford; J. Short, Erin; W. J. Wilson, London; W. A. Thompson, Washago; Auditors, R. Gwatkin, Guelph; W. W. Forsyth, Toronto. The representatives to the various fairs have yet to be appointed.

The auditors presented their report at the beginning of the afternoon session, stating that they had examined the books and found them correct, with a credit balance of $130.96. It was moved by Dr. Tennent, seconded by Dr. Buckley and carried that the auditors' report be accepted.

Discussion then followed concerning the A. V. M. A. and it was moved by Dr. McGilvray, seconded by Dr. Fowler and carried, that an invitation be extended to the association for them to hold their next annual meeting in Canada.

"The Relationship of Sweet Clover to an Acute and Fatal Disease in Cattle," was then presented by F. W. Schofield of the Ontario Veterinary College. Dr. Schofield in his address stated that this disease was first brought to their notice last December and that experiments and postmortems indicated that its cause was sweet clover ensilage and hay. Only moldy ensilage or hay is apparently the cause. A brief report of the work done in this investigation was inserted in the last issue of the *Canadian Veterinary Record*, and a further report is being prepared.

The next paper, "Better Sires," was by R. Wade, Director of the Livestock Branch, Ontario Department of Agriculture. He

remarked that the veterinary profession could only flourish where stockmen were convinced of the value of good livestock. The "Better Bull Campaign," which his department has been carrying on for the past two years was fully explained, and shown to be a very progressive movement. Mr. Wade concluded his excellent address by saying that it had been proven that good livestock was more essential from a financial standpoint than good crops.

Thomas Olsen of the Harris Abattoir next addressed the meeting on "Hog and Bacon Grading in Canada." In his address he pointed out the vital necessity of improving the bacon type of hog in this country if Canada wished to market her bacon in England. The Danish farm systems of cooperative breeding, growing, killing, packing and selling were described, and grading after killing was advocated by the speaker. He claimed that Yorkshire swine would put Canada on the map as a raiser of good bacon.

After this entertaining and instructive talk Dr. McGilvray suggested the advisability of the association framing a resolution respecting rail grading to be forwarded to the proper departments.

The afternoon session concluded with an address by C. H. Higgins of New York, who spoke on the necessity of more observation by the average veterinarian. He also touched on "service," stating that the men who can provide the service can get the money.

Robert Barnes, Chief Inspector, Meat and Canned Foods Act, who has recently been appointed President of the Canadian National Poultry Association was the first speaker of the evening. His address, "The Relation of the Poultry Industry to the Veterinarian" contained many outstanding facts. He impressed on his hearers the need for a better knowledge of the prevention and the control of poultry diseases, and remarked that the man who can put "caponizing and the treatment of poultry diseases" on his shingle will be helping both himself and the industry.

The next speaker was T. P. White, Assistant Chief, Hog Cholera Control Division of the B. A. I., who spoke on "Swine Diseases." He mentioned the difficulties encountered in the United States in the control of hog cholera owing to different laws existing in different States, and compared this condition

with the method in Canada where the Ministry can enforce the law throughout the Dominion. Various diseases of swine were ably dealt with by the speaker.

The last address was by F. Torrance, Veterinary Director General, who stated that only $5,000 was lost in animals through hog cholera in Canada last year. He then proceeded to give an interesting talk on veterinary science in Canada, pointing out the tremendous field in the fox-farming industry.

Two instructive films were shown at the conclusion of Dr. Torrance's address, one dealing with tuberculosis and the other with roundworms in hogs.

Some discussion took place at the beginning of the second day's session concerning the relationship existing between the Ontario Veterinary Association and the Ontario Humane Society, and it was moved, seconded and carried that a committee be appointed from the Ontario Veterinary Association to interview the Ontario Humane Society with a view to getting a better understanding between the two societies and to recommend that a veterinarian be appointed as chief inspector in Toronto, and if possible in other cities. Also that a prominent member of the O. H. S. and Dyce Saunders, K. C., be invited to the next regular meeting to address the Association to make clear to the members the laws relating to the O. H. S.

T. B. Buckley then announced that he would move at the next regular meeting that "In future the election of officers shall take place on the evening of the first day of the regular meeting, and that no man shall be nominated unless he is present. Also that a member of the executive committee automatically drops out of the committee if he is not a regular attendant at executive meetings."

Court J. Spencer, of Dundee, N. Y., gave a talk on "Practical Hints on Surgical Restraint and Technique." He illustrated his address by showing on model stocks useful methods of shoeing vicious horses, dehorning cattle, restraining hogs, etc.

J. Dunn, of Barrie, next addressed the meeting on "Surgery in Poultry Practice." He gave the treatment for fractures, impaction of the crop and wounds. Caponizing was also thoroughly discussed.

This paper was followed by one on "Differential Diagnosis of Diseases of Poultry," by W. A. Thompson of Washago. In this paper Dr. Thompson gave an outline showing the most

characteristic symptoms of certain common but important poultry diseases. It is hoped to publish this helpful paper in the C. V. R.

Mr. McCallum of the Horse Division, Department of Agriculture, was next called upon to speak. He stated that veterinarians could do great work in connection with this division in the improvement of horses in Canada. He strongly urged the veterinary profession to discourage the breeding of poor quality horses.

At the beginning of the afternoon session a demonstration in caponizing was given by J. Dunn, who has had cosiderable experience in this work. Each step of the operation was thoroughly described to an interested group of spectators.

"The Horse, Canada's Cheapest Farm Power," was the address delivered by Wayne Dinsmore, Secretary, Horse Association of America. In calling for a more wide appreciation of the usefulness of the horse, not only on the farms, but by people generally, the speaker went on record as declaring that not only was the horse more efficient than the tractor on small farms, but last-minute experience had indicated that on the bigger farms and ranches horses were more useful and efficient than tractors. Mr. Dinsmore made a plea for the more general use of the horse in place of the motor car, pointing out that horseback riding was one of the most healthful of exercises.

The session concluded with a demonstration in the treatment of sterility in a cow by J. N. Pringle, of Toronto. Examination per rectum revealed one normal and one cystic ovary. An equine clinic had been arranged by W. J. R. Fowler and T. B. Buckley of Toronto, but owing to the lack of time this unfortunately had to be abandoned.

During the meeting arrangements were made for visitors to see through the abattoir, guides being provided by the Health of Animals Branch.

Owing to lack of space and the fact that the copy has to be rushed to the printers, this report is necessarily very brief. Thanks are extended to all who helped to make the meeting a success, including those who took part in the program and discussions, the exhibitors of biologics, pharmaceuticals and instruments, Dr. Brind, Inspector-in-Charge, Harris abattoir, the Motion Picture Bureau, and the Harris abattoir for their kindness in providing their recreation room, cafeteria and cigars.

J. S. GLOVER, *Secretary.*

MISSISSIPPI VALLEY DIVISION OF BUREAU VETERINARIANS

A special meeting of the Mississippi Valley Division N. A. B. A. I. V. was held at the Federal Building, East St. Louis, September 18, 1922. A round-table program was in order, President Dr. C. T. Snyder presiding. Drs. J. W. Joss and J. S. Jenison reported the activities of the N. A. B. A. I. V. meeting held at St. Louis, August, 1922.

A lively discussion followed, relative to the next meeting place at Chicago, December, 1923, with the U. S. Live Stock Sanitary Association, the efficiency examining board and the intended drive for a majority membership and the Retirement Act.

It was thought advisable to appoint a committee to draw up resolutions and present at next meeting of the National Association to amend the By-Laws to read per capita tax one dollar per annum.

Dr. Bruns was appointed special solicitor. Dr. Jenison, Vice President at large, has promised lively news letters at regular intervals.

All Bureau veterinarians are requested to attend the next meeting November 14, Public Library, St. Louis, for another round-table discussion. O. E. BARTH, *Secretary.*

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of the Veterinary Medical Association of New York City was called to order by the President, Dr. Robert S. MacKellar, in the New York State Veterinary College building, 331 East 26th Street, on June 7, at 8.30 p. m. The minutes of the May meeting were read and approved.

Dr. Charles H. Higgins entertained the members with an interesting talk on "Glandular Extracts in Veterinary Practice." Dr. Higgins has had extensive experience in laboratory work and in watching the results in practice. He is convinced that the glandular products should have an important place in the treatment of animals and especially so to men engaged in canine practice. A lively discussion followed Dr. Higgins' discourse.

Dr. Slawson said he used a number of the glandular extracts

with good results. Dr. Rohar gives pituitary extract in retained placenta in bitches and cats.

Dr. Gannett said he had two cases of dystokia in cats lately. He gave 1 c.c. pituitin with satisfactory results. Dr. Kock and others joined in the discussion.

Dr. Alexander Slawson read an instructive paper on "Miliary Tuberculosis in Dogs." In the doctor's opinion this disease is quite common in house dogs. They contract it from the people with whom they live. He showed the photograph of an English bull terrier, 3 years old. The doctor was called to examine him after the dog had a long swim, when he showed severe dyspnea and extreme exhaustion. The doctor was called to examine him again 5 weeks later and found him emaciated, dull, listless and with pendulant abdomen. Diagnosis: tuberculosis. He was destroyed and a postmortem held which showed generalized miliary tuberculosis. A section of the peritoneum showing a generalized infection was exhibited. In the discussion which followed Dr. Bruce Blair said he diagnosed three cases of tuberculosis in dogs, verified by postmortem. These cases all came from families in which some of the members suffered from this disease.

Dr. Gannett reported on two Boston terriers which he attended, both being infected with tuberculosis. These dogs slept in the bed with a woman who had the disease.

Dr. Ackerman reported a case of spontaneous recovery of rabies in a dog.

A telegram was read announcing the marriage of Dr. O. E. McKim to Miss Jene Bruce, giving his future residence as 3438 Filbert Street, Philadelphia. It was moved that a night letter of congratulations from this association be sent to Dr. McKim, which was seconded and carried.

The President appointed Drs. Gannett, Slawson and Bruce Blair as delegates to the New York State Veterinary Society Convention and Dr. Reid Blair as delegate to the A. V. M. A. Convention.

The Secretary read a letter from Dr. Herman Stark, asking the association to accept his resignation as a member. It was regularly moved, seconded and carried that Dr. Stark's resignation be accepted.

No further business appearing, the meeting adjourned.

J. ELLIOTT CRAWFORD, *Secretary.*

COMMUNICATIONS

VETERINARY CONDITIONS IN NORWAY AND SWEDEN

To the Editor:—

This is my promised letter giving you what few scraps of information I have gleaned on my trip. I sailed for Norway on August 1 and went to Christiania via Bergen. At Christiania I met Professor Halth of the Veterinary Institute, who is a most active, progressive man; he keeps closely in touch with American work and takes our Journal. Though he does not talk English very well, I learned the following facts from him:

Swamp Fever.—They have had about 70 cases; the infection came from Sweden. All cases have occurred along the border. Prof. Halth believes in slaughter, and has killed 30 cases this summer. The animals die in summer and fall. A few live into the winter; some recover and are carriers. Diagnosis very difficult; history of importation helpful. Halth has noticed increase in lymphocytes and diminution of eosinophiles. He believes that insects carry the disease, as it is a summer disease and does not occur at high altitudes.

Rouget.—Plenty of rouget exists in the country. This is also a summer disease. Rouget serum made from horses is used; 50 c.c. is the dose for an adult pig; 90 to 95 per cent recovery after treatment.

Hog Cholera.—Rare outbreaks occur; only 2 or 3 last year. Origin of outbreaks impossible to trace.

Glanders.—Very rare. Subcutaneous test is used on all imported horses.

Foot-and-Mouth Disease has been kept out of the country. The disease comes from Denmark into Sweden. It is believed that the infection is nearly always brought in by cattle buyers. Authorities do not believe that birds play any part in carrying contagion.

Strangles serum is used extensively and most successfully. It is made at the Institute. They use Schütz streptococcus, and if possible obtain strains of organisms from the different outbreaks.

Tetanus serum is also produced at the Institute.

Tuberculin is made from a mixture of bovine and human strains in 200 c.c. flasks. They are working on a rabbit test for their tuberculin, much after Schroeder's test on guinea-pigs, but they seem to rely on cutaneous reactions on the injected rabbits.

Prof. Halth works diligently and only had one assistant, two girls and a laboratory man on the premises.

There are district veterinarians. Where there is no local practitioner, as in Alten district where I am at present, the Government veterinarian attends to all cases. However, as the distances are very great the veterinary often arrives too late to help the animals.

Stockholm Veterinary School.—This is the finest veterinary school I have ever seen. I did not have time to go over all the buildings, but they are large, well lighted, and the class-rooms excellent. The bacteriological department seems the most active department. Prof. Gergman was away in Germany when I called. Prof. Dahlstrom, the head of the college, helped me very much on my reindeer work. They only have a hundred students at the school. Prof. Dahlstrom is much interested in the Swedish Society for the Prevention of Cruelty to Animals, and has invented a humane killer. He is strongly against the practice of pithing, and is trying to stop the practice amongst the Lapps. In my recent paper on the Alaska reindeer industry I spoke in favor of pithing, as it is quite easy to run a knife through the medulla and into the brain at one thrust. I explained this to Prof. Dahlstrom and he argued that if this was so, he had no objection to offer. Tuberculin testing is going on in Sweden and Norway, but as far as I can learn they are conservative about killing. When there are udder lesions present they kill and pay compensation.

Prof. Dahlstrom made a trip into Russia last year to look into the cattle plague situation. Apparently he is satisfied that there is no danger of its invading Scandinavia. Prof. Dahlstrom is very anxious to visit America.

In Norway Dr. Jensen's influence (Copenhagen) is strong and many Norwegian veterinarians are graduates of his school. I have little to add except to say that I am interested in my trip.

Getting near the reindeer is difficult at this time of the

year as the deer are so high up in the mountains. The climbing is hard, as there are so many rock slides to cross. There have been no serious epizootics among the reindeer for several years. The last one was some form of lung trouble at Christiania. They thought it was due to a Pasteurella, but they told me that the specimens reached them in glycerin and that their cultures were not very successful.

SEYMOUR HADWEN.

Bosekop (Alten), Norway, Sept. 3, 1922.

MORE ABOUT THE HORSE ENDURANCE TEST

TO THE EDITOR:—

The Breeders' Gazette of Chicago in its issue of August 31, on page 235, has a three-column article by Wm. W. Dinsmore, Secretary, Horse Association of America, on our recent 300-mile endurance test. He did not tell all about it, though. He should have said that the judges were Major Henry Leonard of Washington, D. C., and Colorado Springs, Mr. D. Byrant Turner, Colorado Springs, and Major G. E. Cullum of Washington, D. C., who is Chief of the Remount Department of the U. S. Army. They were the most efficient and impartial men with whom the writer ever was connected. There were also three veterinarians, Dr. M. J. Dunleavy of Denver, Lieut. B. C. Bridges, Army Veterinary Corps, from Fort Reno, Okla., and the writer, and all were "on the job" from start to finish. The State Humane Society, too, was well represented and also well pleased.

Another thing Mr. Dinsmore did not emphasize was that the more purebred blood coursing in the animal's veins the better able he was to stand the test.

There were very many interesting details to this test, but they are too numerous to write about, besides they might not interest readers at a distance.

Please let the veterinarians of the country know that horses are still able to cover "the distance," especially since a large number of the younger men scarcely believe a horse can "get anywhere."

A. J. SAVAGE,

Colorado Springs, Colo.

NECROLOGY

Lowery Laymon Lewis, dean of the faculty of Oklahoma A. and M. College, died at his home in Stillwater September 26, following an illness of several months.

Dr. Lewis was the oldest member of the college faculty in point of service. He went to Stillwater in 1896 as professor of veterinary medicine and as State Veterinarian. In 1899 he became professor of zoology and experiment station bacteriologist. In 1900 he was made dean of the school of veterinary medicine; in 1914 of the school of science and literature, and in 1921 dean of the faculty, a position created for him.

At the time of his death he also held titles of professor of veterinary medicine, professor of zoology, experiment station bacteriologist and veterinarian.

He was acting president of Oklahoma A. and M. College nearly a year, between the administrations of J. H. Connell and J. W. Cantwell, in 1914-15. He was born near Newport, Tenn., September 3, 1869, moving to Texas when ten years old.

In 1893 he received the degree of bachelor of science in agriculture at Texas Agricultural and Mechanical College, College Station. Later in the same year he took his master of science degree there. In 1894 he took a doctor of veterinary medicine degree at Iowa State College, Ames. Lewis was recognized as the father of athletics at Oklahoma A. and M. College. Lewis Field, the scene of varsity athletics, was named in his honor nearly twenty years ago. For many years he was chairman of the athletic council. Among the alumni of the college Lewis was known as "Doc Lew."

In later years, old timers of the alumni and former students have returned to Stillwater to visit him. He was the only man on the campus whom they had known when in college. Last spring the alumni corporation started plans to erect a memorial of some sort to him. It was desired to build it before his death. The committee appointed to get suggestions relative to it and to provide ways and means for it has not completed its work.

About five years ago Lewis suffered a stroke of paralysis, from which he recovered and resumed his work at the college. Several months ago, while returning to Stillwater from a trip

to Texas, he was taken suddenly ill, and for many weeks was at the point of death. His condition improved until he was able to ride about town, but was unable to go to his office. Recently he became weaker.

Dr. Lewis is survived by his widow, a son and a daughter.

Doctor R. A. Branson, of Cottonwood Falls, Kansas, died at a hospital in Topeka, Kansas, on August 28, following an operation for appendicitis.

Doctor Branson was a graduate of the Kansas State Agricultural College, Veterinary Division, in the class of 1911. He joined the A. V. M. A. in 1915.

James Breckenridge Paige, formerly head of the department of veterinary science at Massachusetts Agricultural College, died suddenly October 5, 1922, at the sanitarium in Waverly after a long illness. Dr. Paige was widely known in Western Massachusetts, where his many activities brought him in contact with all classes of people. He performed notable service for the college and for the community, bringing to its accomplishment keen intelligence, sound training, courage, the will to perform. Sincere in his friendships, those who knew him trusted him implicitly, a trust that never was betrayed. Whatever of distinction was gained by the veterinary department at the college was mainly due to Dr. Paige. It was largely through his exertions and influence that the Legislature made appropriations for the veterinary laboratory and stables on the college grounds. For years he served as veterinarian to the State Board of Agriculture. In matters pertaining to his profession he was a recognized authority.

He was born in Prescott in 1861, the son of Francis B. Paige. He was graduated from the Massachusetts Agricultural College in 1882, and in 1888 from McGill University, with the degree of doctor of veterinary science. After practicing his profession in Northampton three years he was appointed a professor at the Massachusetts Agricultural College, where he organized the department of veterinary science. He later engaged in graduate study at McGill University and at Munich, Germany. A republican in politics, he represented the district in the Legislature in 1902 and 1903. He served as a member and clerk of the committee on agriculture, and a member of

the committee on public health. Had he chosen to remain in politics he might readily have gained nomination and election to the Senate. He was a member of Pacific Lodge, A. F. & A. M., serving as Worshipful Master. He served also as Past District Deputy of the 17th Masonic District, as a trustee of the Masonic Home at Charlton, and was a member of the Royal Arch Chapter and higher bodies in Masonry. For several years he was secretary of the General Association of the Alumni of M. A. C. He was a member of the Amherst Club, and served as its president. He married, in Bondsville, December 28, 1885, Ada Russell, daughter of Richard Russell, who survives him, with one daughter, Beryl Paige, now studying for M. D. degree at Columbia University. He also leaves two brothers, Dr. Henry E. Paige, of Amherst, and Frank E. Paige, of Brookline. Dr. Paige was a good citizen, a good neighbor, a dependable friend. Those who knew him best feel sincerest sorrow in his passing.

Antirabic treatment was administered to 998 persons at the Pasteur Institute, Paris, during 1921, with only one death.

A French scientific commission for the study of cancer, appointed by the Minister of Hygiene and headed by Dr. Roux, director of the Pasteur Institute, has among its members two veterinarians, Professors Cadiot and Petit of Alfort.

A leading article on "Selection as a Method of Improvement of Domestic Animals," by Prof. J. L. Frateur, Director of the Institute of Zootechny of Louvain, in a recent number of the Belgian veterinary journal *Annales de Médecine Vétérinaire*, shows that our Belgian confrères are alive to the importance of the veterinarian having a good knowledge of animal breeding.

A German medical commission which was appointed in 1920 to select German terms to replace French and English terms used in German medical literature has made its report giving a list of new expressions proposed as substitutes for the old. The list as published in the *Deutsche Medizinische Wochenschrift* and the *Münchener Medizinische Wochenschrift* contains more than fifty terms.

MISCELLANEOUS

PACKERS INDUCED TO PAY BETTER PRICES FOR REACTORS

In the campaign for the eradication of tuberculosis in cattle being carried on by the United States Department of Agriculture, the States, and counties, one of the most important economic considerations is the salvage, at a fair price, of the animals that react to the test. Up to a year and a half ago a large percentage of the reactors that were passed by the inspectors as perfectly fit for food did not bring a fair price, because some buyers took an unfair advantage of the seller and profited unreasonably.

The Department of Agriculture through the Bureau of Animal Industry and the Packers and Stockyards Administration has been looking into this matter for a year or more, taking it up with packing concerns, commission men, and organizations interested in the marketing of livestock. As a result much better prices are now being paid. Reports to the Department show that the prices being paid for such cattle in various parts of the country are getting very close to the prices paid for the same class of cattle on the regular market. A special traveling inspector now spends all his time visiting livestock markets, noting prices that are being paid for reactors and insisting that buyers who are discriminating against them pay a fair price.

Carcasses of reactors that have been passed by the Federal inspectors are worth as much and are as wholesome as any other carcasses. There is no warrant for price discrimination against them. Many of the leading packers at the big markets and a large number of the smaller concerns on many markets now see the justice of this view, with the result that reactors are now selling at more nearly fair prices.

The department has compiled figures on the prices received for reactors in a number of States for 1921 and 1922, and in several of them the increase in average price has been considerable, in a few instances reaching more than 100 per cent. In Kansas the average price paid for these cattle rose from $16.52 to $34.26; in Minnesota from $17.74 to $24.48; in Missouri from $15.60 to $31.93; in Wisconsin from $16.09 to $26.25, and in

Vermont, where only one firm had been handling them previously, from $5.61 to $16.29. In 18 States, including the livestock and dairy States of the Middle West and a number of Eastern States, the average price paid increased about $3.00 a head. The department expects that continued efforts on the part of the bureau and the Packers and Stockyards Administration will result in still better prices for reactors.

Packers, commission men, and livestock exchanges are getting behind the movement for better prices since they have been impressed with the fact that the encouragement of the work of tuberculosis eradication means more and better business in the future. The Institute of American Meat Packers passed a resolution calling upon the members to pay as much for reactors as for untested cattle of the same quality.

In connection with this discussion of prices, it is well to keep in mind that the area method of eradicating the disease has an additional advantage in that more reactors are available from one place at one time and, consequently, can be shipped at less expense and can be handled more economically at the yards and in the packing house.

FOOT AND MOUTH DISEASE IN JAMAICA

Reference was made on page 131 of the October number of THE JOURNAL to "A Suspicious Disease in Jamaica." Immediately on receipt of information concerning the character of the symptoms and lesions of the disease as given in the report of the Veterinary Consultant of the Jamaica Agricultural Department to the Colonial Secretary, the United States Bureau of Animal Industry on August 16 issued instructions as a protection to our livestock industry, debarring Jamaica hides, skins, etc., from entering the United States. That the suspicions of the Bureau were well founded is revealed in the information contained in the following article which appeared in the September 19 issue of *The Daily Gleaner*, published in Kingston, Jamaica. It seems from the letter of September 11, quoted in the article, that early in his observation of the disease the Veterinary Consultant was fully convinced of its nature, but suppressed such diagnosis from motives which are apparent in this letter.

CATTLE DISEASE NOW DIAGNOSED "FOOT AND MOUTH."—GOVERNMENT VETERINARY MAKES STATEMENT CONCERNING TRUE NATURE OF OUTBREAK IN THE WEST.—ACTION EXPLAINED.—HEAVY RAINS IN PARISHES HAVE CAUSED DISEASE TO TAKE SEVERE FORM.

Through the courtesy of the Acting Colonial Secretary, *The Gleaner* publishes the following copy of a Government notice relating to the outbreak of disease among cattle in the western parishes, which has been diagnosed as "'Foot and Mouth Disease."

Colonial Secretary's Office,
18th September, 1922.

Referring to Government Notice No. 409, dated the 25th of July last, declaring Calf Diphtheria (Necrotic Stomatitis) to be a contagious or infectious disease within the meaning of the Contagious Diseases Animals (Inland) Law, 1909 (Law 1 of 1909), it is hereby notified for general information that the disease has now been diagnosed by the Government Veterinary Consultant as Foot and Mouth Disease under that Law.

The following report of the Government Veterinary Consultant dated the 11th of September, 1922, addressed to the Acting Director of Agriculture, is published for general information.

(Sgd.) D. H. HALL,
Acting Colonial Secretary.

THE REPORT

"Merton," Halfway Tree,
September 11, 1922.

To Acting Director of Agriculture,
Hope.

Sir: I have the honor to submit my fifth interim report on the cattle disease in the western parishes.

I left Kingston the 7th instant, and proceeded to Sav-la-Mar.

In the majority of cases where there have been heavy losses there has been evidence of excessive handling and harassing of cattle such as driving far distances to the pen, catching and throwing animals down in order to rub their mouths with salt, Seville oranges, etc.

Having regard to the occurrence of the severe form of the disease on properties which I had anticipated would have only the mild form; the difficulty of securing efficient quarantine with range cattle; the question of the exportation of hides, a contingency which I did not foresee, I desire to make a statement concerning the true nature of the outbreak in the western parishes and at the same time to give an explanation of my attitude in regard to it.

On my first visit to the Montpelier area on July 18th, I observed symptoms among the affected cattle which filled me with grave fears as to the nature of the disease. Wishing to prevent, if possible, the spread of the disease should my suspicions be correct, and at the same time to minimize a threatened panic among the penkeepers, I telegraphed to you that the disease, which I termed "Necrotic Stomatitis and Coronitis," should be immediately scheduled under the Contagious Diseases Animals (Inland) Law 1 of 1909.

The remainder of my time was occupied to discover the limit of spread of the disease and to devising methods of treating range cattle under the prevailing conditions.

On my following visit July 24th, my suspicious were fully confirmed that the disease was "Foot and Mouth" disease. By this time, however, its spread was found to extend over a much wider area than was at first supposed, involving the three parishes.

"Necrotic Stomatitis and Coronitis" had already been declared a contagious disease and quarantine measures were being enforced.

As it seemed that the method of stamping out the disease by slaughter was impracticable, and, because all outbreaks outside the original infected area gave every indication of running a very mild course, I hope to be able to arrest the disease by means of quarantine and decided to withhold my opinion.

About this time heavy rains began to fall over the original infected area and surrounding hills which adversely affected many animals.

Since this time rains have been experienced almost daily. Many properties which I anticipated would have a mild form of the disease have recently been experiencing the severe form.

For this reason as well as to prevent the exportation of hides with the risk of infection to other countries I have decided to disclose the true nature of the disease which, as stated above, I had hoped to arrest at as low a cost as possible and without causing great panic.

It is my particular desire that this portion of my report should be given full publicity, as I am unwilling that any blame should be attached to your or any other department.

I have the honor, etc.,

(Sgd.) G. O. RUSHIE GREY,
Govt. Vety. Consultant.

The veterinary school at Alfort, France, closed its session last summer with 205 students, including a graduating class of 76.

The Washington *Star*, telling of the efficacy of Dr. Maurice C. Hall's carbon tetrachlorid treatment for hookworms, says: "A single dose removed all of the parasites from 90 per cent of 12,000 patients treated in the Fiji Islands." Pretty good for one dose!

At a recent meeting of the Lewisham Division of the British Medical Association, Prof. Frederick Hobday, a distinguished British veterinarian, presented a paper on "The Necessity for Cooperation of the Medical and Veterinary Professions in the Control and Eradication of Diseases Intercommunicable between Man and Animals."

In the Belgian Congo bananas are regarded as a good food for livestock, according to L. Pynaert in the *Bulletin Agricole du Congo Belge*. As a general rule bananas are fed to animals only when there is a surplus of the fruit. The fruit is fed in two forms—the peelings, and the dried fruit as a flour or meal. The peelings are rich in protein and fat, and the flesh of the fruit has a high content of carbohydrates.